CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF CITY PLANNING

DRAFT
ENVIRONMENTAL IMPACT REPORT

UNDERWATER WORLD AQUARIUM AT PIER 39

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State Clearinghouse No. 88020217

PUBLICATION DATE: August 12, 1988
PUBLIC HEARING DATE: September 29, 1988
PUBLIC COMMENT PERIOD: August 12, 1988 through September 29, 1988

Written comments should be sent to the Environmental Review Officer, 450 McAllister Street, Sixth Floor, San Francisco, CA 94102

D REF 711.57 Un21d

Underwater World
aquarium at Pier 39 :
1988.

3 1223 03556 0755

City and County of San Francisco
Department of City Planning

450 McAllister Street
San Francisco, CA 94102

TO: Distribution List for the Underwater World Aquarium at Pier 39 EIR

FROM: Barbara W. Sahm, Environmental Review Officer

SUBJECT: Request for the Final Environmental Impact Report for Underwater World Aquarium at Pier 39

This is the draft of the Environmental Impact Report (EIR) for the Underwater World Aquarium at Pier 39. A public hearing will be held on the adequacy and accuracy of this document September 29, 1988. After the public hearing, our office will prepare and publish a document titled "Summary of Comments and Responses," which will contain a summary of all relevant comments on this Draft EIR and our responses to those comments. It may also specify changes to this Draft EIR. Those who testify at the hearing on the draft will automatically receive a copy of the Comments and Responses document along with notice of the date reserved for certification (usually about 9 weeks after the hearing on the draft); others may receive such copies and notice on request or by visiting our office. This Draft EIR, together with the Summary of Comments and Responses document, will be considered by the City Planning Commission in an advertised public meeting and certified as a Final EIR if deemed adequate.

After certification, we will modify the Draft EIR as specified by the Comments and Responses document and print both documents in a single publication called the Final Environmental Impact Report. The Final EIR will add no new information to the combination of the two documents except to reproduce the certification resolution. It will simply provide the information in one rather than two documents. Therefore, if you receive a copy of the Comments and Responses document in addition to this copy of the Draft EIR, you will technically have a copy of the Final EIR.

We are aware that many people who receive the Draft EIR and Summary of Comments and Responses have no interest in receiving virtually the same information after the EIR has been certified. To avoid expending money and paper needlessly, we would like to send copies of the Final EIR to private individuals only if they request them.

If you want a copy of the Final EIR, please so indicate in the space provided on the next page and mail the request to the Office of Environmental Review within two weeks after certification of the Final EIR. Any private party not requesting a Final EIR by that time will not be mailed a copy. Public agencies on the distribution list will automatically receive a copy of the Final EIR. Copies will also be available at the Department of City Planning, 450 McAllister Street - 5th floor, San Francisco, California 94102.

Thank you for your interest in this project.

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Department of City Planning
450 McAllister Street - 5th Floor
San Francisco, California 94102

ATTN: Catherine Bauman

(fold here)

REQUEST FOR FINAL ENVIRONMENTAL IMPACT REPORT

To: Department of City Planning, Office of Environmental Review

Re: Underwater World Aquarium at Pier 39)

(____) Please send me a copy of the Underwater World Aquarium at Pier 39 Final EIR.

Signed: _____

Print Your Name and Address Below:

_____
(Name)

_____
(House Number and Street)

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(City, State and Zip Code)

If you are requesting an FEIR, please tear this page out, show your address above, fold the mailer so that your return address and the Department of City Planning's address is exposed, seal, add postage and mail.)

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I. SUMMARY

INTRODUCTION

The following Draft Environmental Impact Report discusses the potential environmental impacts of a proposed project on Pier 39 in the Fisherman's Wharf Area of San Francisco. This report addresses issues that the San Francisco Department of City Planning has determined to have potential to cause significant impacts on the environment.

A. PROJECT DESCRIPTION

The Underwater World Company (a company formed by Pier 39 Limited Partnership, ERA Equities of San Francisco and Argus Questar Corporation of Auckland, New Zealand) proposes to construct an aquarium and marine educational facility on existing and new piles over the Bay at Pier 39. Currently, the entire Pier 39 complex contains 198,000 gross square feet of space including restaurant and retail use and a 240-seat theatre. The proposed aquarium would be constructed on the southeast edge of the existing Pier 39 complex, on a site which presently contains a video amusement facility, a service road and 16 boat slips in the Pier 39 marina.

The proposed aquarium would contain a total of 48,200 gross square feet (gsf) including lobby and public circulation space (2,800 gsf), a book shop (2,200 gsf), office and staff space (3,800 gsf), exhibit areas (6,300 gsf), a function room and adjacent service area (2,350 gsf), a large tank (9,500 gsf), service area (1,550 gsf), tank service areas (3,800 gsf), and ancillary space (15,900 gsf). As part of the proposed project the sponsor would expand the capacity of the existing Pier 39 parking garage by 100 to 120 spaces and would cause 400 spaces to be opened to the public on weekends at the AMPCO parking garage at 80 Francisco Street in order to accommodate additional demand generated by the Underwater World project. The building would have one off-street loading space and would rise two stories to a height of 40 feet with a ten-foot mechanical penthouse.

The aquarium would require an amendment to the previous Pier 39 Conditional Use Authorization from the City Planning Commission (CPC Resolution 7551) for the construction of a commercial recreation facility within the Northern Waterfront Special Use District No. 1.

B. ENVIRONMENTAL IMPACTS

1. LAND USE, ZONING, BAY FILL (pages 70 to 77)

The proposed aquarium would result in an intensification of uses on Pier 39. The proposed project would contain a total of 48,200 gsf. Approximately 3,600 square feet of the existing building on the site would be removed, 3,500 gsf of the existing building would be incorporated into the aquarium for a net increase of 41,100 square feet. The proposed project would extend an additional 19,400 square feet over the water of the Pier 39 Marina. This proposed new pier area will be considered new Bay Fill by the Bay Conservation and Development Commission. About 11,800 square feet of this space would be covered by the proposed aquarium building and about 7,600 square feet would be a perimeter access road and pedestrian walkway. The proposed project would be a commercial recreational use in an area with other such uses. It would be permitted as a conditional use.

2. URBAN DESIGN AND VISUAL QUALITY (pages 78 to 86)

The proposed project would result in the removal of a structure attached to the southeast portion of the octagonal building at the entry of Pier 39. The replacement structure would have two stories and would rise 40 feet above the street. An elevator penthouse tower, located near the southeast corner of the building, would rise to a height of 50 feet above the street, 10 feet higher than the rest of the building. The building design would include numerous setbacks and sloped roofs. Building material would include glass block, wood siding, sloped dark-colored painted metal roofs and board form concrete.

The proposed project would be most noticeable from vantage points along the Embarcadero to the southeast and would obstruct some views of the Pier 39 Marina from the pedestrian walkway along the Embarcadero. The structure would not be seen from the pedestrian corridor of Pier 39 as it would be blocked by existing structures. It would be visible from Telegraph Hill.

3. TRANSPORTATION (pages 87 to 118)

In the first year, when traffic impacts would be their greatest, the proposed project would generate about 7,750 net new weekday daily (two-way) person trips and about 7,810 net new weekend daily (two-way) person trips with an hourly attendance limited to 900 visitors. Weekday p.m. peak-hour (5:00-6:00) person trips would increase by about 150 and weekend p.m. peak-hour (3:00-4:00) person trips would increase by about 170.

The project sponsor would expand the capacity of the existing Pier 39 parking garage by 100 to 120 spaces and would cause 400 parking spaces to be opened to the public on weekends at the AMPCO garage at 80 Francisco Street. Potential measures which would help to direct drivers to the reserved parking at 80 Francisco Street include modifying the existing Pier 39 garage sign at the corner of The Embarcadero/Beach, placing sandwich boards along The Embarcadero and supplying traffic/parking control personnel to direct people to the additional parking.

The proposed project would result in increases in volume-to-capacity ratios at 3 of the 8 study area intersections on weekdays and 3 of the 8 study area intersections on weekends. No significant level of service changes would occur due to project traffic.

4. AIR QUALITY (pages 119 to 120)

The Bay Area Quality Management District (BAAQMD) considers that development generating less than 2,000 vehicle trip ends per day would not have a measurable impact on air quality and therefore does not require an air quality analysis for such developments. The project would generate about 1,220 new vehicle trip ends daily. Where cumulative development could measurably contribute towards regional and/or local emissions, the District may require an air quality analysis.

Cumulative development in San Francisco would not lead to an increase in total Bay Area ozone concentrations. It is possible that excess NO_x emissions generated by cumulative development could increase ozone and/or nitrogenous oxidant concentrations further downwind, outside the Bay Area. In addition, NO_x emissions generated by cumulative development throughout the Bay Area could increase acid rain further downwind, outside the Bay Area, though to a relatively small extent.

Emissions of particulates resulting from construction and from vehicle trips generated by the projects and cumulative development would increase TSP concentrations, which could increase the frequency of the particulate (PM-10) standard violations in San Francisco, with concomitant health effects and reduced visibility.

5. WATER QUALITY/BIOLOGY (pages 121 to 124)

Because the variety of fish selected for the proposed aquarium would be indigenous to the San Francisco Bay and Northern Pacific waters, the project sponsor proposes to use Bay water in the aquarium. Before going into the tank, the water would be filtered and disinfected.

The proposed project would produce two wastewater discharges into the Bay. The first would be a continuous discharge from the recirculating system. This "blowdown" discharge would be in compliance with all applicable effluent limits and water quality standards and would produce no adverse effects on the Bay waters. The second discharge would be the intermittent flow of water used to clear the filters. This "backwash" would remove particulate materials from the tank. The project sponsor would be required to meet all effluent standards as required by the Regional Water Quality Control Board (RWQCB). The new piles could affect water circulation in the vicinity of the site. Current speeds would not be reduced below present levels by a sufficient amount to appreciably affect sedimentation.

6. GEOLOGY/TOPOGRAPHY (pages 125 to 127)

The proposed project would be constructed on piles through Upper Bay Mud into Lower Bay Clay and dense sand. In a moderate earthquake (7.5 on the Richter scale), minor damage would occur to the tank. In a major earthquake (8.5+ on the Richter scale) severe damage would occur, but there would be no collapse of the tunnel or tank. The acrylic tank and tunnel would be anchored in a gravel base and sealed with an elastic material that could articulate (flex) to prevent fracturing.

7. CONSTRUCTION NOISE (pages 128 to 133)

Construction of the proposed project would take place over a 14 month period, with the highest noise levels being generated by pile driving (105 dBA at 50 feet) which would take place over a 7 to 9 week period. It is anticipated that the noise levels generated during

construction would result in a disturbance to workers and residents in nearby buildings. Mitigation measures have been incorporated into the project to minimize noise impacts on surrounding uses during construction.

8. GROWTH INDUCEMENT (page 134)

The proposed project would result in 41,100 gross square feet of new space in the Fisherman's Wharf area. The project could induce commercial growth in the area, because of the increased number of visitors.

C. MITIGATION MEASURES

Some of the mitigation measures included in the proposed project are listed below; the complete list of mitigation measures, both those included in the project and those not included, is found in Section V, pages 135 through 149.

TRANSPORTATION

- Time-specific admission tickets would be required to control the visitor flow at a level commensurate with the capacity of the proposed aquarium. The project could not physically accommodate more than 900 visitors per hour. However, the projected attendance demand could be much greater than 900 hourly visitors.

- The project sponsor would increase the capacity of the garage by 100 to 120 spaces by restriping to increase the number of compact stalls (18 spaces), reconfiguring the layout of existing stalls (22 spaces), and increasing valet operations in the garage (60 to 80 additional valet spaces beyond the number of valet spaces used today during peak summer weekends).

- The project sponsor would modify the existing Pier 39 garage to provide a second garage access point at the Stockton/Beach intersection and by recessing control gates, which would provide additional off-street stacking area, improve circulation in the project vicinity, and reduce congestion at the Powell/Jefferson/Embarcadero intersection (one of the garage circulation alternatives studied would provide a third access, also on Beach Street).

CONSTRUCTION NOISE

- The project sponsors would require that the construction contractors limit pile driving activity to the hours between 8:00 a.m. to 6:00 p.m. This would require work permits from the Director of Public Works pursuant to the San Francisco Noise Ordinance Section 2907(c).

- The construction contracts would require that the project contractors muffle and shield intakes and exhaust, shroud or shield impact tools, and use electric-powered rather than diesel-powered construction equipment, as feasible, so that noise would not exceed limits in the City Noise Ordinance (Article 29, San Francisco Police Code, 1972)

WATER QUALITY/MARINE BIOLOGY

- The project sponsor would meet all effluent standards as required by the Regional Water Quality Control Board.

- Only species native to Northern California Pacific and Bay Waters would be contained in the aquarium.

D. ALTERNATIVES (pages 152 to 169)

ALTERNATIVE ONE: NO PROJECT

This alternative would entail no change to the existing site or uses on the site. The environmental characteristics associated with this alternative would be the same as those described in the Environmental Setting section of this EIR. The alternative would involve no change to the project site as it now exists and none of the impacts associated with the proposed project would occur.

The project sponsor has rejected this alternatives because it does not meet any of their objectives as outlined in the Project Descriptions sections of this EIR.

ALTERNATIVE TWO: DIFFERENT WATERFRONT LOCATION

This alternative involves two variants: Variant One would locate the proposed Underwater World Aquarium at the front of Pier 37, and Variant Two would locate the

proposed Underwater World Aquarium on a pier south of the the San Francisco-Oakland Bay Bridge.

Under Variant One of this Alternative, the building facade would be typical of other pier structures and would be parallel to The Embarcadero. Impacts associated with air quality, operating noise, water quality and marine biology, and growth inducement would not change as compared to those described for the proposed project in Chapter 4, Impacts, of this document. Impacts relating to urban and visual quality would be greater than the proposed project as the building would extend east along The Embarcadero using open space and blocking Bay views. Transportation impacts associated with volume/capacity flows, vehicular-related air quality emissions, and vehicular-related noise would remain unchanged as compared to the proposed project. However, impacts relating to parking and pedestrian circulation could change as the project would be located further east from the "core" of the Fisherman's Wharf Area. Because this alternative would require more than twice as many piles to be driven into the Bay than is currently proposed, impacts relating to construction noise and geology/topography would be greater.

The project sponsor has rejected this alternative because it would block important view corridors, use open space, and would extend pedestrian traffic into an area that conflicts with other business activities and heavy road traffic.

The second variant to alternative two is the location of the proposed aquarium south of the Bay Bridge. For the purpose of analysis, Pier 30-32 has been selected. Under this Alternative, impacts relating to land use would be similar to the proposed project in that it would be two stories and use approximately the same site area of 25,400 square feet. The impact on visual quality resulting from the blockage of Bay views could, under the worst case, be greater than those for the proposed project. However, the extent of the impact would depend on the configuration of the proposed project in the pier structure. Visitor trips generated under the alternative would be similar to that for the proposed project site. However, the traffic to Pier 30-32 would be new traffic. Because most of the access for this alternative would be by auto, there would be an increase in auto circulation and parking demands in the area. The increased travel demand could result in increased impacts on vehicular-related air quality and noise impacts in the vicinity of the alternative site. Impacts relating to construction, air quality, water quality, and marine biology and geology/topography would be similar to those impacts related to the proposed

project. Impacts relating to construction, noise could be greater or less than the proposed project depending on the number of new piles required. Growth-inducing impacts could be greater than those described for the proposed project as this alternative would introduce a commercial recreation use into an area which was traditionally maritime/industrial.

The project sponsor has rejected this alternative because of its remote setting, conflicts with other land uses in the area, and inability to meet their objectives as outlined in the Project Description.

ALTERNATIVE THREE: ENTIRE PROJECT ON EXISTING PIER 39

This alternative would require the construction of the Underwater World Aquarium on the existing pilings on the site, without extending the existing pier apron farther into the Bay. The project would be considerably smaller and would displace more existing businesses. No boat slips would be removed.

Under this alternative, approximately 25,400 square feet of existing occupied building space would be replaced as compared to replacement of 3,500 square feet with the proposed project. Visual quality and urban design impacts could be less, as the Aquarium would not extend south into the marina. Transportation and growth inducement impacts would generally remain unchanged as compared to the proposed project. Because there would be greater amounts of demolition, there would be greater impacts on air quality and construction noise than those currently proposed. Pedestrian access and circulation would be more congested at the southern end of Pier 39 as access would be closer to the main entry-way to the entire Pier 39 development. Construction impacts relating to water quality and marine biology would be greater under this alternative than the proposed project because about 200 piles would have to be removed from Pier 39 before installing about 114 new piles.

The project sponsor rejects this alternative because the existing fill on Pier 39 does not provide sufficient loading capacity required for the large concrete tanks or the proper design criteria required for seismic safety.

ALTERNATIVE FOUR: NON-WATERFRONT LOCATION

This alternative involves the location of the proposed aquarium across The Embarcadero on Seawall Lot 314, which is bounded by Bay and Kearny Streets and The Embarcadero.

The site currently contains a gas station, approximately 20 parking spaces and an automotive car wash facility. Because this alternative is not on the waterfront, there would be no new fill on the San Francisco Waterfront; however, large pipes and pumps would be needed to transfer Bay water to and from this alternative site.

Impacts relating to air quality, zoning and growth-inducement would be generally the same as the proposed project. Impacts relating to land use would be greater as the Chevron gas station, parking lot and automatic car wash would be removed. Visual and urban design impacts would be less as existing views of the Bay would remain unchanged. Transportation impacts would generally be the same as the proposed project except for pedestrian circulation which would increase at surrounding traffic intersections near the site. Because there would be no need for additional fill under this alternative, changes to water quality and marin biology would be less than those of the proposed project. Since no piles would be driven, the potential changes to geology and topography would be less than the proposed project.

The project sponsor rejects this alternative because it does not meet the objectives of the project sponsor as outlined in Chapter II of this document and because problems associated with the transportation of ocean water needed for the project would make a non-waterfront location unfeasible. This alternative would also diminish potential educational and recreational aspects related to the Bay.

II. PROJECT DESCRIPTION

1. OBJECTIVES OF THE PROJECT SPONSOR

The project sponsor, the Underwater World Company (a company formed by Pier 39 Limited Partnership, ERA Equities of San Francisco and Questar Corporation of Auckland, New Zealand), proposes to construct an aquarium and educational facility. In proposing this development the project sponsor has the following objectives: to provide a quality recreational facility that will promote the marine and tourist experience associated with the Northern Waterfront area of San Francisco; to teach and highlight the need for Bay and ocean conservation; to provide an educational environment in which both children and adults can experience the types of marine life that are indigenous to the San Francisco Bay; to enhance the nautical identity and image of Fisherman's Wharf; to enhance and strengthen the tourist economy of the City and contribute to revitalizing the Fisherman's Wharf area; to achieve a reasonable return from the financial investment; and to expand employment opportunities for the unskilled labor force.

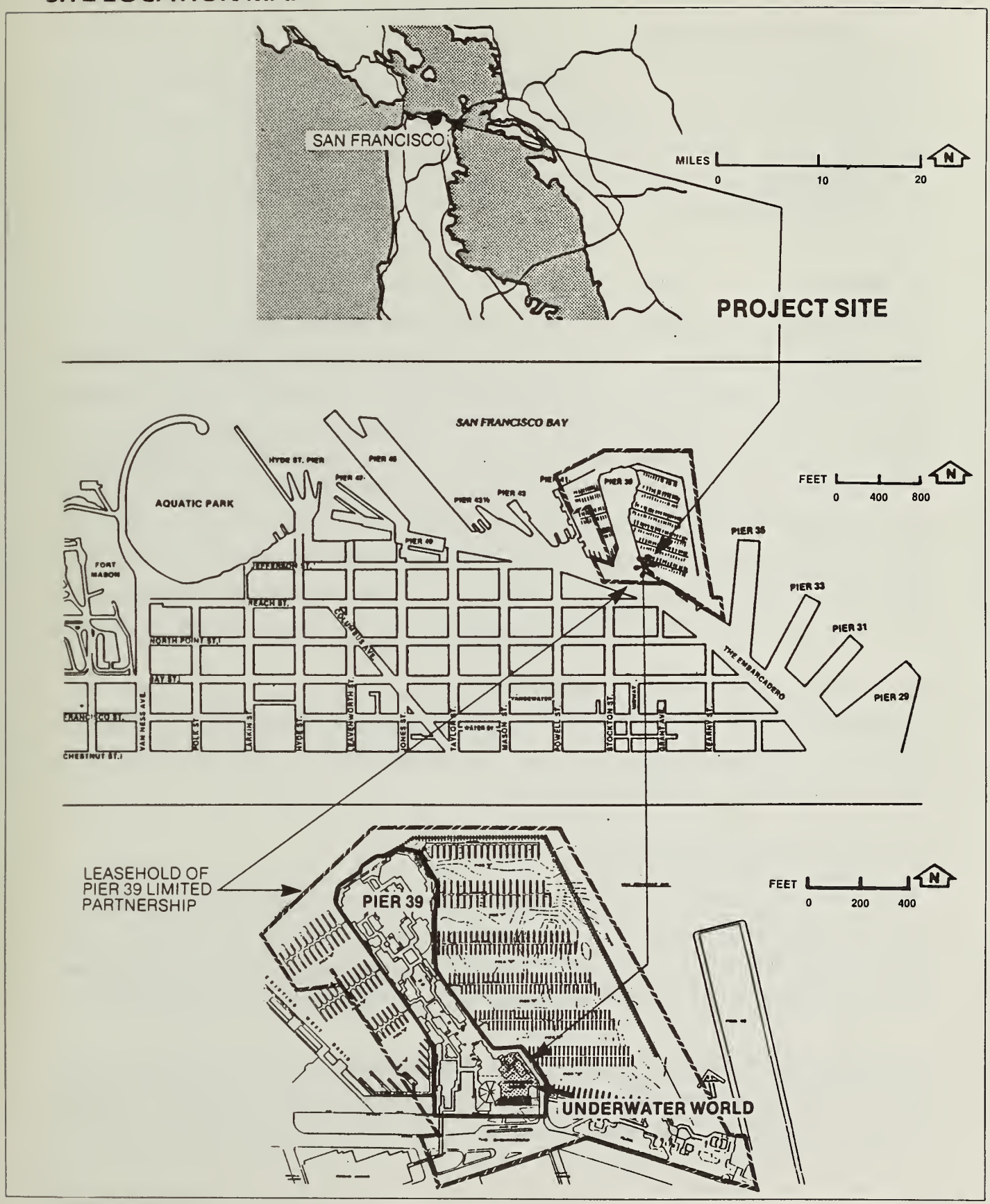
The project architect is Esherick, Homsey, Dodge and Davis of San Francisco.

2. PROJECT LOCATION

The project site is located in the northeastern portion of the City, in the Fisherman's Wharf area of the Northern Waterfront District, north of the Embarcadero between Stockton Street and Grant Avenue (see Figure 1, page 11). The proposed aquarium would be built on the southeastern corner of Pier 39 where an existing amusement arcade now exits. The project site is on Assessor's Block 9900. It is located in a C-2 (Community Business) District and in the Northern Waterfront Special Use District No. 1. The site is leased by the Pier 39 Limited Partnership from the Port of San Francisco.

SITE LOCATION MAP

FIGURE 1



SOURCE: EIP ASSOCIATES

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eip

3. PROJECT DESCRIPTION

The development of Pier 39 was approved in August 1976 as a Conditional Use (City Planning Commission Resolution 7551, modified in March 1980 with CPC Resolution 8548, see Appendix E). Pier 39 consists of approximately 198,000 gross square feet of small-scale retail, restaurant and theatre uses, a 351-berth public marina, a waterfront park, and a 937-car parking garage.

A. Site Area

The proposed project would be an aquarium and educational facility built on piles over the Bay in the Pier 39 marina and attached to the existing Pier 39 development. The entire Pier (from the seawall) consists of 261,676 square feet. The proposed project would add 19,400 square feet of new pier area of which 11,800 square feet would be under the building (aquarium structure) and 7,600 square feet would be other new pier area (roadway, loading, and Pier 39 service area), which would serve both as a service access road to the Pier 39 complex and as public pedestrian access to the perimeter of Pier 39. This additional 19,400 square feet of new pier area would result in the removal of 16 boat slips that currently occupy the Pier 39 marina. As a result of the proposed project, the total new square feet of Pier 39 would be 281,076 (see Table 1, page 13, below).

The proposed project would be constructed on both existing and new piles. Of the total 25,400 square foot footprint of the new building, 13,600 square feet would be built on the existing Pier 39 structure and 11,800 square feet of the building footprint would be built on new piles (see Table 1, page 13).

B. Proposed Project Building Area

The aquarium site currently contains a 2-story building with various video entertainment games on the first floor. The building would be partially demolished on the east side (approximately 3,600 square feet) but the existing octagonal construction on the west side would be retained. There would be no changes to the existing theatre on the second floor.

The proposed project would contain a total of 48,200 gross square feet of floor area. The first story of the proposed aquarium would contain approximately 25,400 gsf of area including the lobby, the main tanks, a book shop, a tidal pool, and mechanical rooms. A

TABLE 1

SITE AREA CALCULATIONS

		Square Feet
Pier 39 Site Area		
Existing		261,676
Proposed New Pier Area		
Under Building Footprint	11,800	
Other New Pier Area	7,600	
Total New Pier Area		19,400
Total Proposed Pier 39 Site Area		281,076
Footprint of New Building		
Portion on Existing Pier		13,600
Portion on New Pier		11,800
Total Footprint of New Building		25,400

Source: Esherick Homsey Dodge and Davis; EIP Associates.

partial mezzanine would contain 7,700 gsf of area including catwalk over the tanks, a book shop mezzanine, a lab, and staff service rooms. The second story of the project would contain approximately 14,550 gsf of area including administrative offices, an education and function room, public spaces and exhibit area, a storage room and a filter yard. At the second story a deck would also run along the eastern side of the building providing views of the Pier 39 marina and the Bay. This deck would be for patrons of the proposed project and not available to the general public. A third story would contain 550 gsf (see Table 2, page 15).

C. Pier 39 Building Area

The entire Pier 39 development is comprised of approximately 198,000 gross square feet (gsf). This includes 123,678 gsf of retail space, 65,872 gsf of restaurant space, 8,450 gsf of theatre space (240 seats) and a 351-slip marina. The proposed project would remove 3,600 gsf of existing retail space and add 44,700 gsf of retail use (for a net change of +41,100 gsf). The proposed project would also remove 16 existing boat slips. There would be no changes to restaurant and theatre uses at Pier 39. Upon completion of the proposed project, there would be a total of 239,100 gsf in the entire Pier 39 complex including 164,778 gsf of retail space (see Table 3, page 16).

D. Other Project Characteristics

The main entrance to the aquarium would be from The Embarcadero, on the east side of the main Pier 39 thoroughfare. Visitors would enter the facility and pass through an educational exhibit (a tide pool display) prior to entering an acrylic tunnel through the aquarium tank.

The aquarium tank would contain approximately 707,000 gallons of salt water drawn from the Bay at the end of Pier 39 and filtered through a set of pressure filtration tanks. Water in the tank would not be heated or cooled; it would remain at the ambient San Francisco Bay temperature, and the circulation system would be semi-closed. A semi-closed system allows the aquarium water to be gradually released and replaced while being continuously circulated and filtered. A moveable walkway would carry visitors through an acrylic tunnel passing through the interior of the aquarium tank. The aquarium would contain approximately 2,000 fish which are indigenous to the Bay Area and Northern California.

TABLE 2

UNDERWATER WORLD AQUARIUM CHARACTERISTICS
(GROSS SQUARE FEET)

	New	Existing	Total
Area By Use			
Lobby/Public Circulation	2,800		
Book Shop	2,200		
Office and Staff	3,800		
Exhibit Areas	6,300		
Function Room and Service Area	2,350		
Large Tank	9,500		
Service Area		1,550	
Tank Service Areas	3,800		
All Other Areas (toilets, halls stairs, storage, auxiliary areas, walls, mech. rooms, etc.)	13,950	1,950	
TOTAL GROSS	44,700	3,500	48,200
Area By Floor			
First	23,400	2,000	25,400
Mezzanine	7,300	400	7,700
Second	14,000	550	14,550
Third	0	550	550
Total Aquarium Area	44,700	3,500	48,200

Source: Esherick Homsey Dodge and Davis; EIP Associates.

TABLE 3

PIER 39 FLOOR AREA CALCULATIONS

		Gross Square Feet	Occupied Square Feet
Pier 39 Existing			
Retail		123,678	111,330
Restaurant		65,872	52,720
Theatre	240 seats	8,450	8,450
Marina	351 slips	N/A[1]	N/A[1]
TOTAL		198,000	172,500
Proposed Project			
Retail			
Added		44,700	23,950
Removed		3,600	3,600
Net Change		41,100	20,350
Marina			
Removed	16 slips		
Pier 39 Future			
Retail		164,778	131,680
Restaurant		65,872	52,720
Theatre	240 seats	8,450	8,450
Marina	335 slips	N/A[1]	N/A[1]
TOTAL		239,100	192,850

[1]Not applicable.

Source: Esherick Homsey Dodge and Davis; EIP Associates.

The proposed project would result in the net loss of approximately 2,400 square feet of landscaping, 500 feet of pedestrian pavement and 800 square feet of covered open space. The proposed project would result in the net addition of 1,500 square feet of roadway which extends around the entire Pier 39 development (see Table 6, page 72).

The proposed project would rise two stories and be approximately the same height as the existing building. The ground floor facade of the proposed project would consist of glass block along The Embarcadero and board form concrete and wooden fencing along the service road. Above ground materials include wood facades, louvers and dark colored metal roofs. A new wooden railing would be constructed, similar to the one which now exists, on the east side of the new pier deck (see Figures 2 through 9, pages 18 to 25).

As part of the proposed project, the sponsor would expand the capacity of the existing Pier 39 parking garage by 100 to 120 spaces by restriping to increase the number of compact stalls (18 spaces), reconfiguring the layout of existing stalls (22 spaces), and increasing valet operations in the garage (60 to 80 additional valet spaces beyond the number of valet spaces used today during peak summer weekends). In addition, the sponsor would cause 400 spaces to be opened to the public on weekends in order to accommodate additional demand generated by the Underwater World project at the AMPCO parking garage at 80 Francisco Street. Signage would be placed near queuing lines along The Embarcadero and traffic/parking control personnel would help redirect people to the parking garage at 80 Francisco Street.

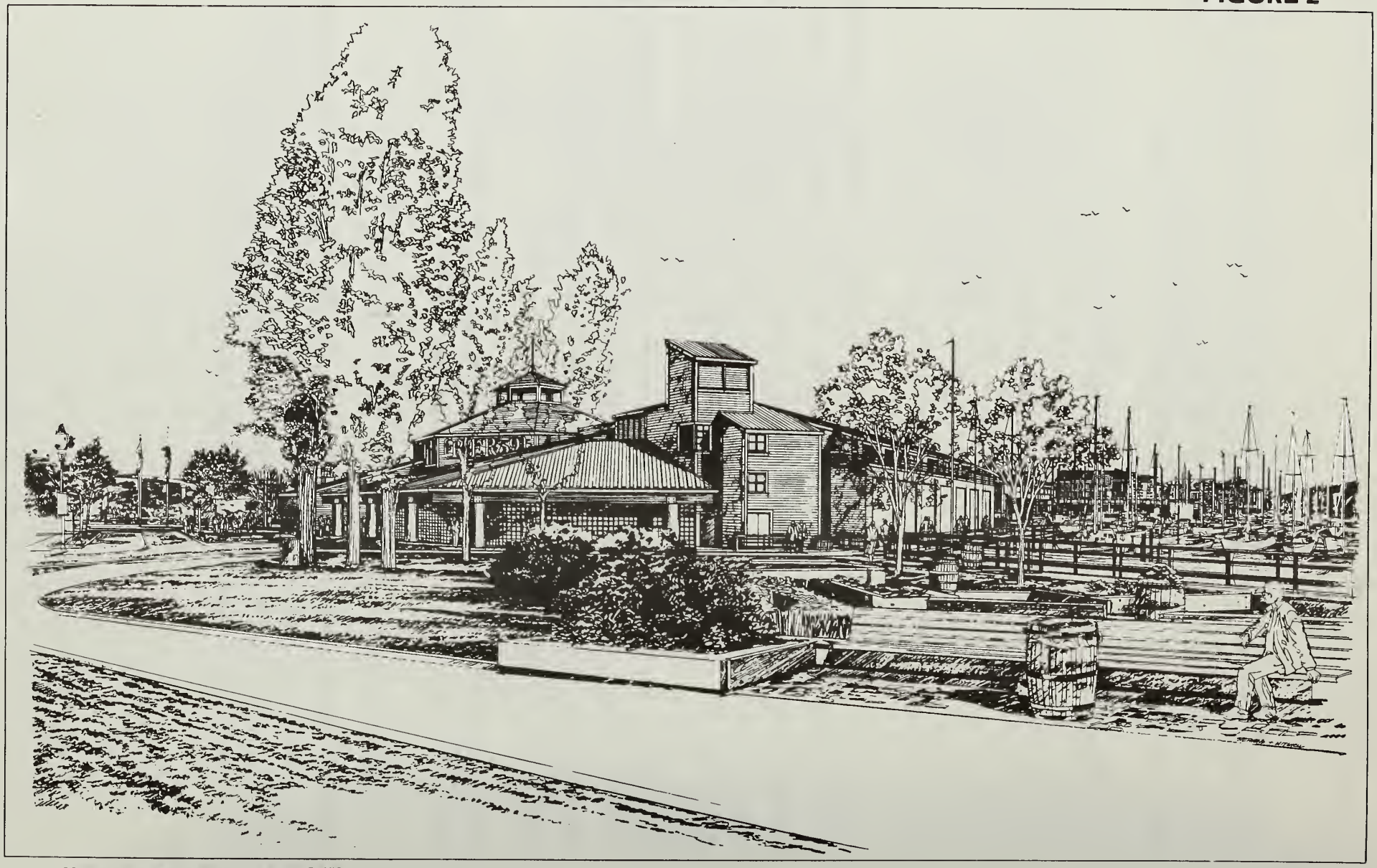
The proposed site plan (see Figure 3, page 19), includes one new off-street loading space to be located on the northern edge of the aquarium.

4. PROJECT APPROVALS

Following a public hearing on this EIR before the City Planning Commission, responses to all written and oral comments will be prepared; this EIR will be revised accordingly and presented to the City Planning Commission for certification as to accuracy, objectivity and completeness. No permits may be issued before the Final EIR is certified.

ARCHITECTURAL RENDERING: VIEW LOOKING NORTHWEST FROM THE EMBARCADERO

FIGURE 2



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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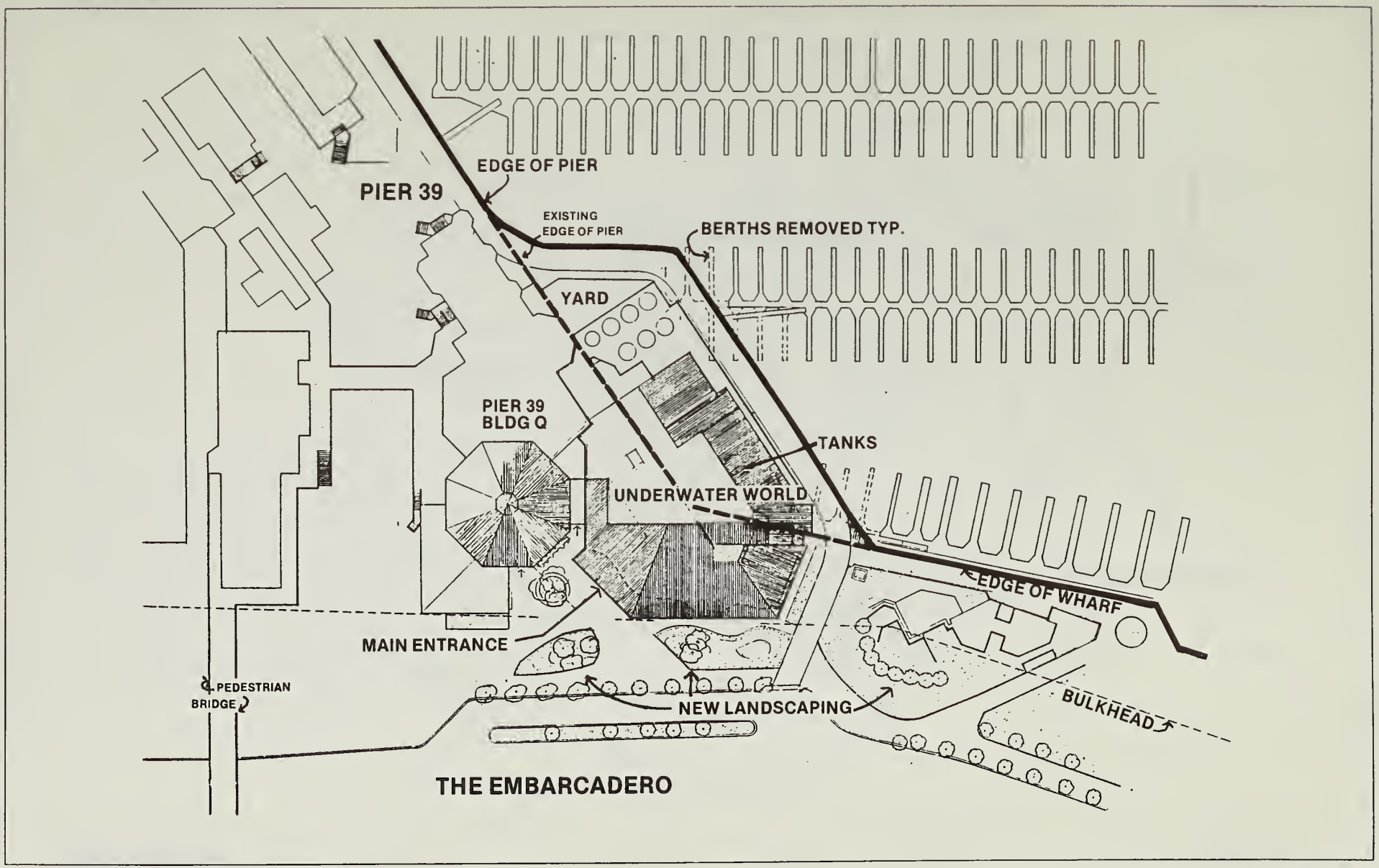
SITE PLAN

FIGURE 3



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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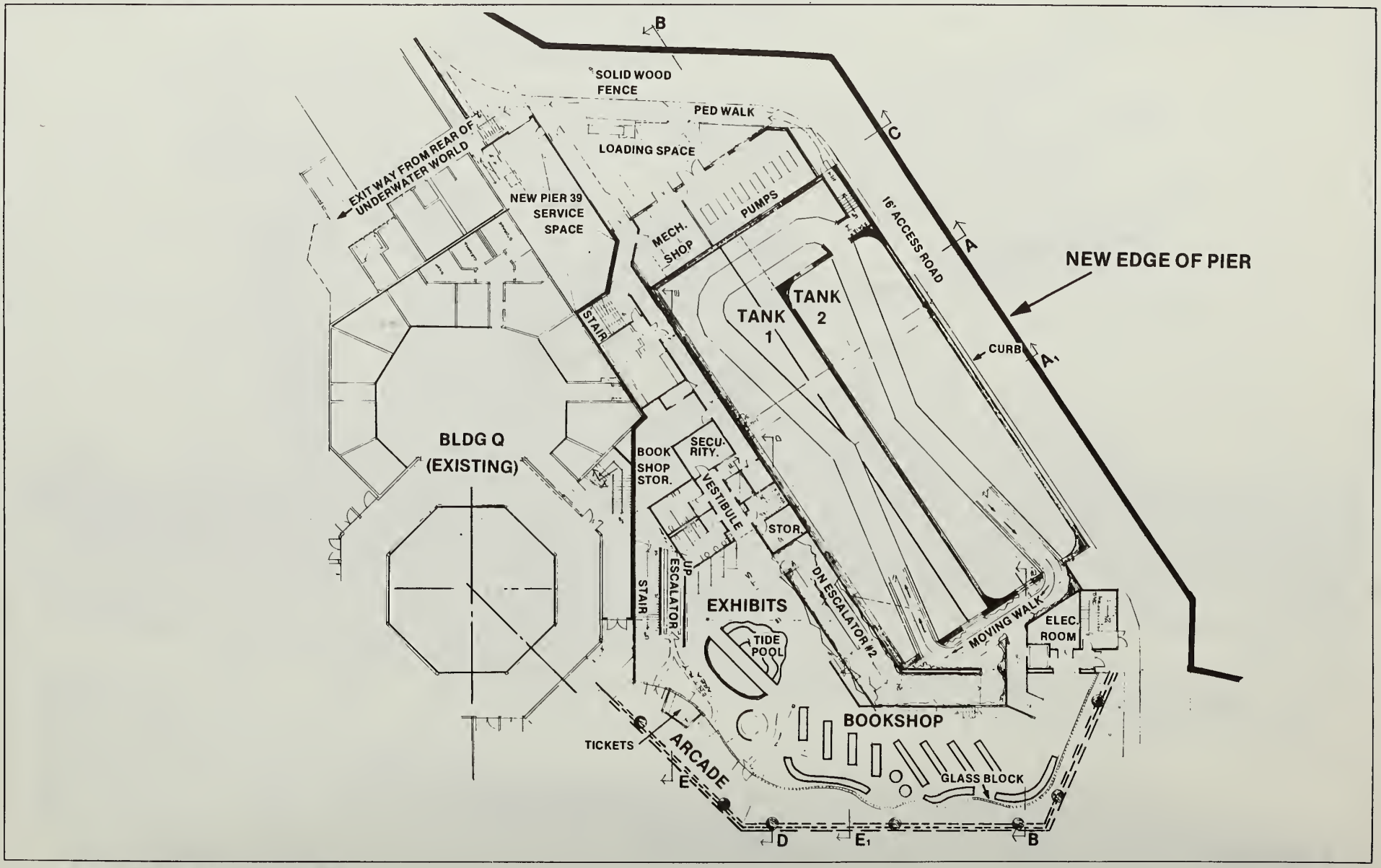
FIRST FLOOR

FIGURE 4



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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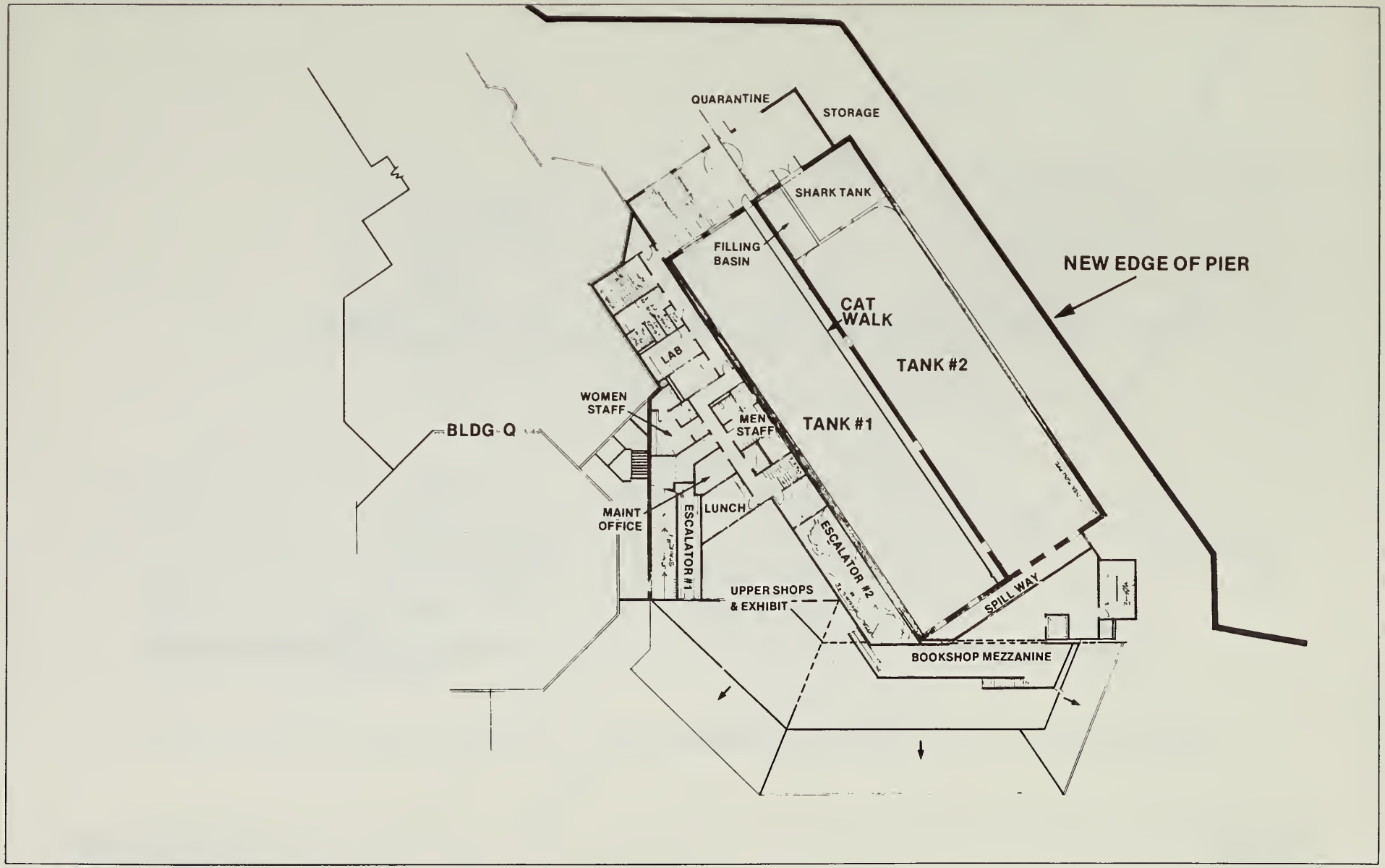
MEZZANINE LEVEL

FIGURE 5



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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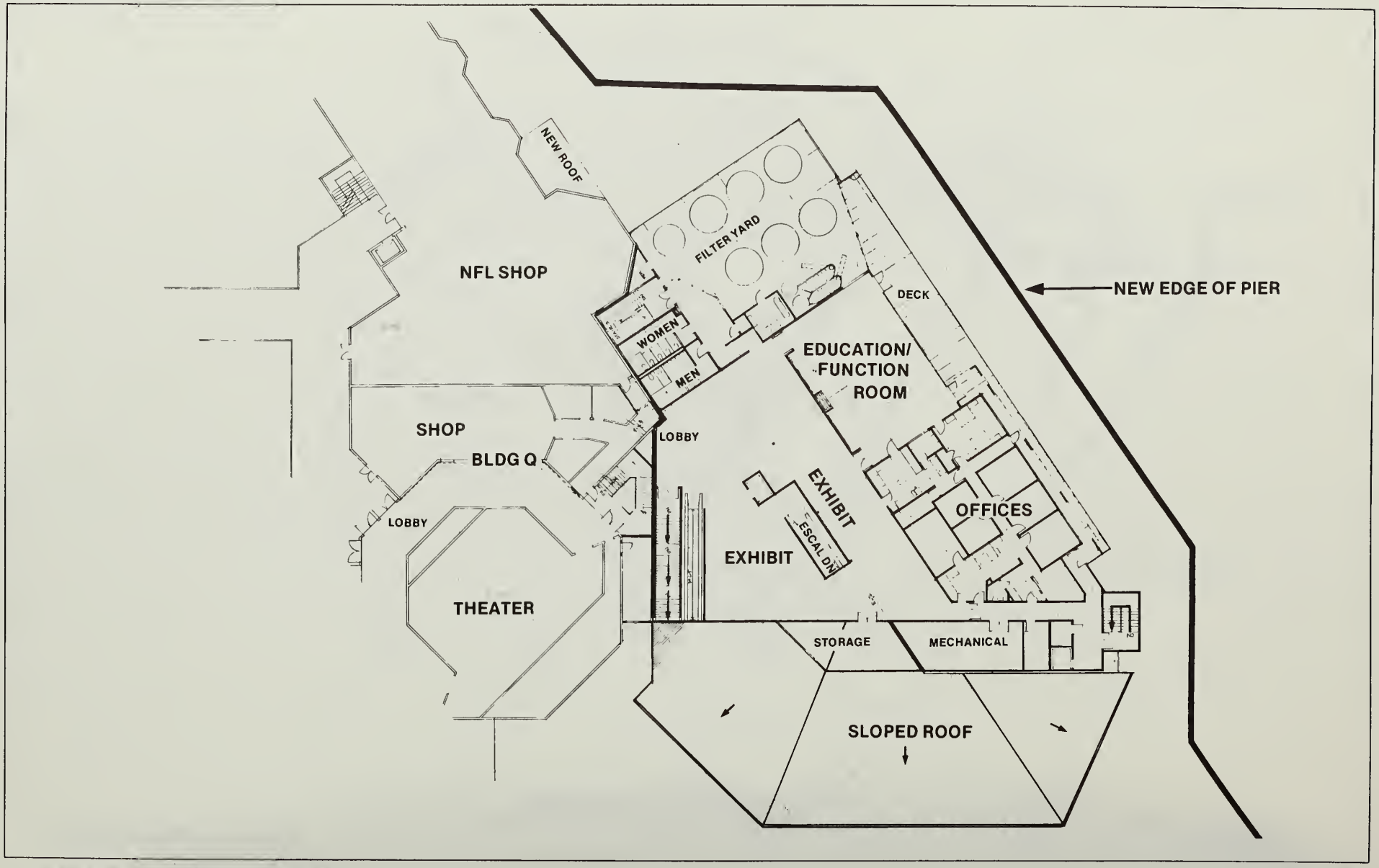
SECOND FLOOR

FIGURE 6



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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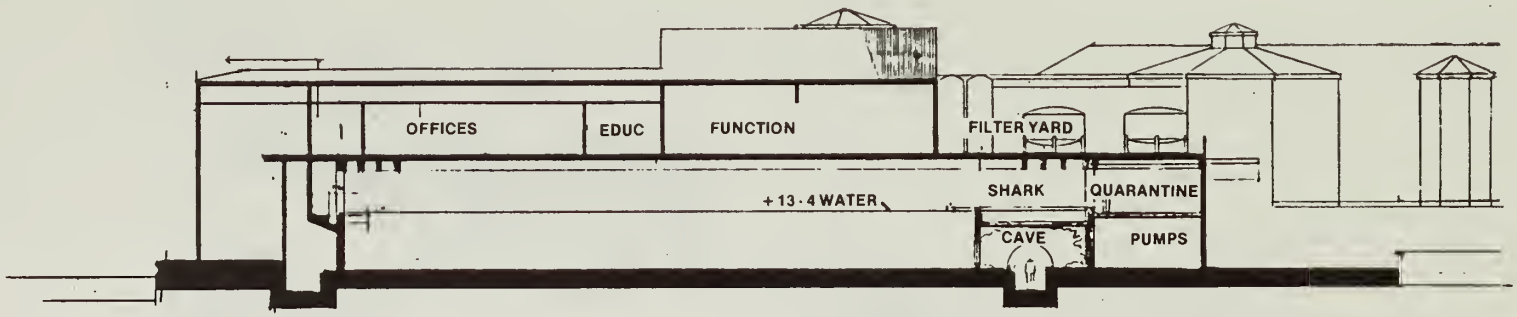
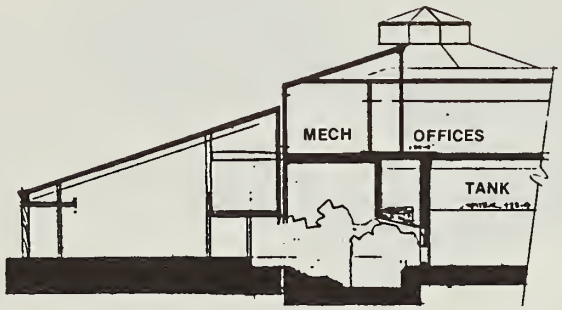
SECTION DRAWING

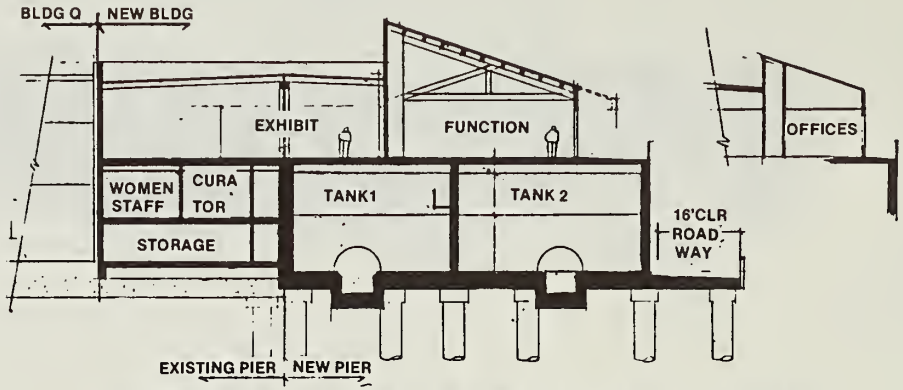
FIGURE 7



SECTION B—B (CUT 24'N OF SOUTH TANK WALL)



SECTION B'—B' (⊥ TO FRONT OF BLDG)



SECTION A—A (CUT 9' WEST OF BLDG Q CORNER)

SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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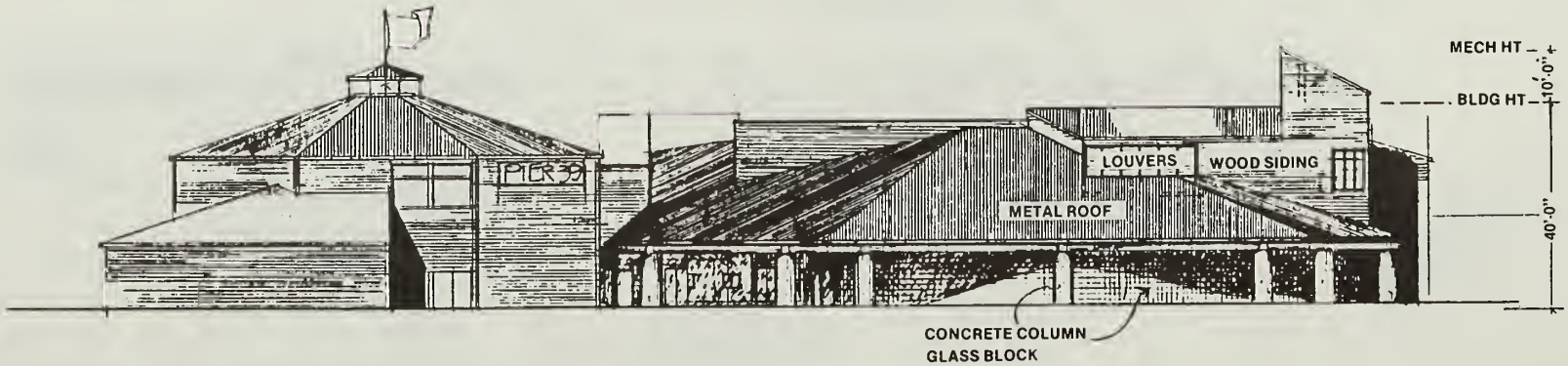
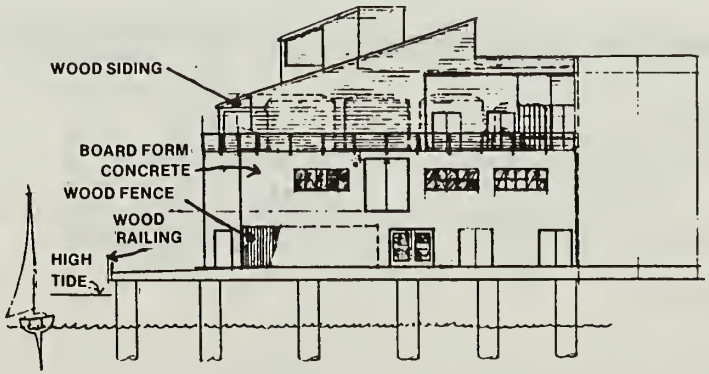
NORTH & SOUTH ELEVATIONS

FIGURE 8



SOUTH ELEVATION



NORTH ELEVATION

SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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EAST ELEVATION

FIGURE 9

EAST ELEVATION

SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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The project sponsor would request an amendment of the current Pier 39 Conditional Use authorization from the City Planning Commission. For this project, Section 151 of the City Planning Code would require the provision of 74 parking spaces. The project would request a reduction of this requirement under Section 240.1(c) of the Code as part of its Conditional Use authorization. Under Section 152 of the City Planning Code, one freight loading space would be required for this project. One freight loading space, which meets the minimum required dimensions under Section 154, would be provided.

On November 14, 1986, the voters of San Francisco passed Proposition M, the Accountable Planning Initiative. Proposition M establishes eight Priority Policies. These policies are: preservation and enhancement of neighborhood-serving retail uses; protection of neighborhood character; preservation and enhancement of affordable housing; discouragement of commuter automobiles, protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership; earthquake preparedness; landmark and historic building preservation; and protection of open space. Prior to issuing a permit for any project which requires an Initial Study under CEQA, and prior to adopting any zoning ordinance or development agreement, the City is required to find that the proposed project or legislation is consistent with the Priority Policies.

In addition to City Planning Commission approval, various City and State actions and approvals would be required. The project sponsor will request that the Port Commission approve the proposed aquarium, and revise the rent structure under the terms and conditions of the existing lease. Building and other related permits would be under the jurisdiction of the Port of San Francisco. Approval would be required from the San Francisco Art Commission which reviews proposed construction on public land.

The Bay Conservation and Development Commission (BCDC) would require a permit pursuant to the McAteer-Petris Act and would be concerned with compliance with that Act and with the San Francisco Bay Plan (in particular the Special Area Plan #1 covering the area of the San Francisco shoreline in which the project is located). BCDC would be particularly concerned with issues relating to the provision of Bay-oriented commercial recreation or Bay-oriented public assembly purposes, public access to the Bay at Pier 39, the addition of pile-supported fill in the Bay, and with impacts on the Bay and fish wildlife

and other natural resources. BCDC would inform the Port about project compliance with Section 307 of the Federal Coastal Zone Management Act of 1972.

A permit would be required from the Army Corps of Engineers (Corps) who has jurisdiction over fill, dredging and dredge spoils disposal under Section 10 of the River and Harbors Act and Section 404 of the Clean Water Act. Corps permits may also be required for construction crane erection.

The State Lands Commission (SLC) has jurisdiction over the development and uses of Port of San Francisco land which the City and County of San Francisco holds in trust from the State under terms and conditions of the Burton Act. No specific permit is required from the SLC. The SLC is kept apprised of project plans by the Port Commission.

The Regional Water Quality Control Board (RWQCB) also would be concerned with the water quality and biology impacts resulting from the project. Under powers delegated by the Environmental Protection Agency and the State Water Resources Control Board, the RWQCB would certify compliance with Section 401 of the Federal Water Pollution Control Act of 1972. A National Pollution Disposal Elimination System (NPDES) permit may also be required.

If the project is found to affect an endangered or threatened wildlife species, a formal consultation with the U.S. Fish and Wildlife Service would be required under Section 7 of the Endangered Species Act and the Fish and Wildlife Coordination Act.

5. PROJECT SCHEDULE AND COSTS

The project sponsors anticipate completion of the project design by mid-1988. Construction would commence once permits were issued. The project would take approximately 14 months to complete; three additional months would be needed to prepare the fish tank for occupants. The project sponsors estimate construction, equipment and pre-opening costs of $14,000,000.

III. ENVIRONMENTAL SETTING

A. LAND USE AND ZONING

1. LAND USE

Project Vicinity

The project site is located in the Fisherman's Wharf area of the Northern Waterfront District. The site is north of The Embarcadero between Stockton Street and Grant Avenue and between Piers 35 and 41. Telegraph Hill is to the south of the project. For many years, the Fisherman's Wharf area was dominated by a combination of maritime commercial uses such as fish processing and other uses serving the San Francisco commercial fishing fleet, and other industrial uses. Since the mid-1960s, tourist-serving uses, including hotels, specialty retail complexes and entertainment establishments, have become the dominant use.

Pier 39 is a mixed-use development operated by Pier 39 Limited Partnership. The footprint of the pier (from the seawall) is 261,676 square feet. On the pier is a variety of restaurants, retail stores, and a 240-seat theatre, totaling 198,000 gross square feet. The buildings and pedestrian corridor were constructed with the use of old wood materials from previous pier and wharf buildings. Open areas within Pier 39 contain a small outdoor theatre for shows and a carousel. At the end of the pier is an observation landing providing a view of the Bay including the East Bay Hills, the San Rafael Bridge, Alcatraz Island, and the Golden Gate Bridge. There is a service road surrounding the pier which provides service access to businesses as well as continuous pedestrian access around the pier. To the southeast of Pier 39 is Pier 35, a terminal for large luxury liner cruise ships. To the west is Pier 41 which is a terminal for chartered and scheduled boat cruises of the Bay. Between these piers and The Embarcadero lies landscaped open space with a boardwalk, flowerboxes, lawn and benches.

As part of the approval of Pier 39 in 1976, the sponsor was required to provide and maintain a public park in this area, between Pier 35 and Powell Street. The 40,000 square feet closest to Pier 35 has not yet been improved.

Across the Embarcadero from the aquarium site is the Pier 39 parking garage (bounded by The Embarcadero, Powell Street and Beach Street). A pedestrian overpass links the garage to Pier 39 over the Embarcadero. Within two to three blocks of the project are a variety of two and three story mixed-use office buildings, hotels, and the North Point Apartment complex (bounded by North Point, Bay, Powell and Grant) with 514 units (see Figure 10, page 31).

Fisherman's Wharf

In the past 40 years San Francisco has lost its dominant maritime position in the Bay Area and the Wharf has turned from a very active fishing port to an area with tourism as its primary use. In the 1960s, the Old Ghirardelli Chocolate Factory, the Cannery and other historic buildings were refurbished for retail use. Restaurants, which were already established, increased their business and many new ones were started. There also was an increase in the number of hotels, and since 1980 the Fisherman's Wharf area has consistently had the highest hotel occupancy rate of any district in the City (the Super 8 and Clarion Hotels, approved September 1987, will add 568 rooms or 21.8% to the Northern Waterfront area). Tourism in the Fisherman's Wharf area has grown into a multi-million dollar a year business providing jobs for residents and tax revenues for the City. But with such growth, there have been resulting changes in the area which prompted the City Planning Department to study the Fisherman's Wharf area in greater detail. The Northern Waterfront Findings Report (March 1987), analyzed land use patterns and traffic and transportation related issues in the Northern Waterfront area. The decrease of fishing related industry, contrasted with the influx of tourism, led the report to conclude that the Fisherman's Wharf area is "losing its attraction because of physical deterioration and lack of an identity and unified image." For a more detailed description of current planning activity in the area, see page 71 of this EIR.

San Francisco

The City of San Francisco has many recreational and educational establishments in addition to those at Fisherman's Wharf. These establishments are visited by both residents and visitors. They include maritime-related attractions located at Fort Mason, cultural facilities located throughout the City, the San Francisco Zoo in the southwest corner of San Francisco, and a concentration of museums and other attractions, including the Steinhart Aquarium, in the east end of Golden Gate Park.

2. ZONING

The project site is located in the C-2 (Community Business) zoning district, which encompasses most of the Fisherman's Wharf area north of Bay Street to the piers (see Figure 11, page 32). In a C-2 District, professional and business offices, retail business and personal services, residential and hotel uses are permitted as principal uses.

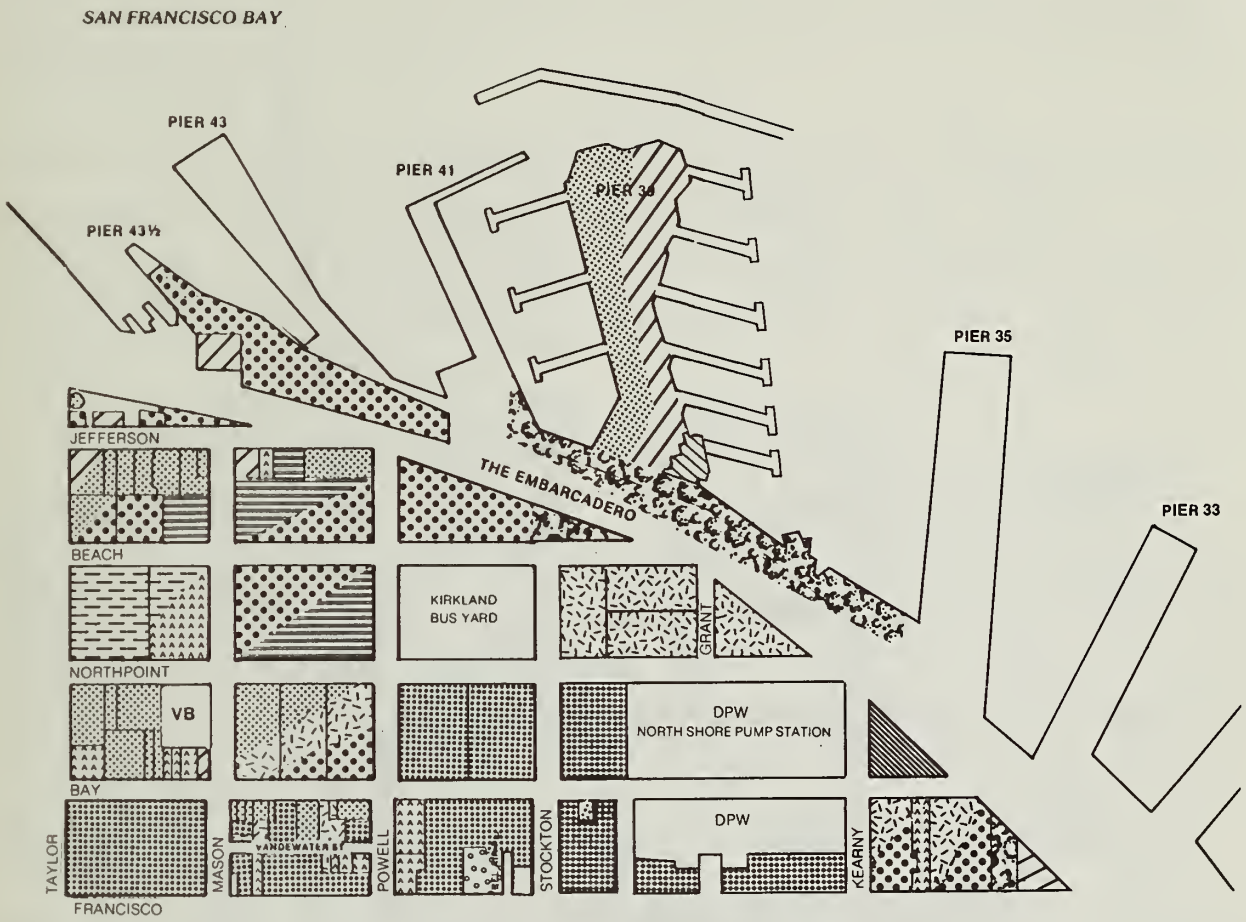
The project site is also located within the Northern Waterfront Special Use District No. 1, described in Section 240.1 of the City Planning Code. Development on this site is subject to the provisions of this special use district which supersede the provisions of the C-2 zoning district. The applicable provisions of Sections 240.1 state that a Conditional Use authorization is required for all uses other than, "waterborne commerce and navigation, and industrial, commercial and other operations directly related to the conduct of waterborne commerce or navigation."

The project site is in the 40-X Height and Bulk District which controls the entire Northern Waterfront area. In this district the maximum allowable building height is 40 feet above the street. There is no requirement regarding maximum bulk.

Off-street parking is required for commercial uses in the C-2 District by Section 151 of the City Planning Code. For retail space, the Code requires one space for each 500 square feet of occupied floor area up to 20,000 square feet, where the occupied floor area exceeds 5,000 square feet, plus one for each 250 square feet of occupied floor area in excess of 20,000 square feet. For restaurants, the City Planning Code requires one parking space for each 200 square feet of occupied floor area, where the occupied floor

EXISTING LAND USES IN THE FISHERMAN'S WHARF AREA

FIGURE 10



LEGEND

- Residential
- Retail
- Restaurant
- Hotel
- Office
- Other Commercial
- School
- Public Parking
- Private Parking
- Under Construction
- VB Vacant Building (Hotel Approved for This Lot)
- Proposed Aquarium Site
- Open Space
- Gas/Car Wash

SOURCE: EIP ASSOCIATES

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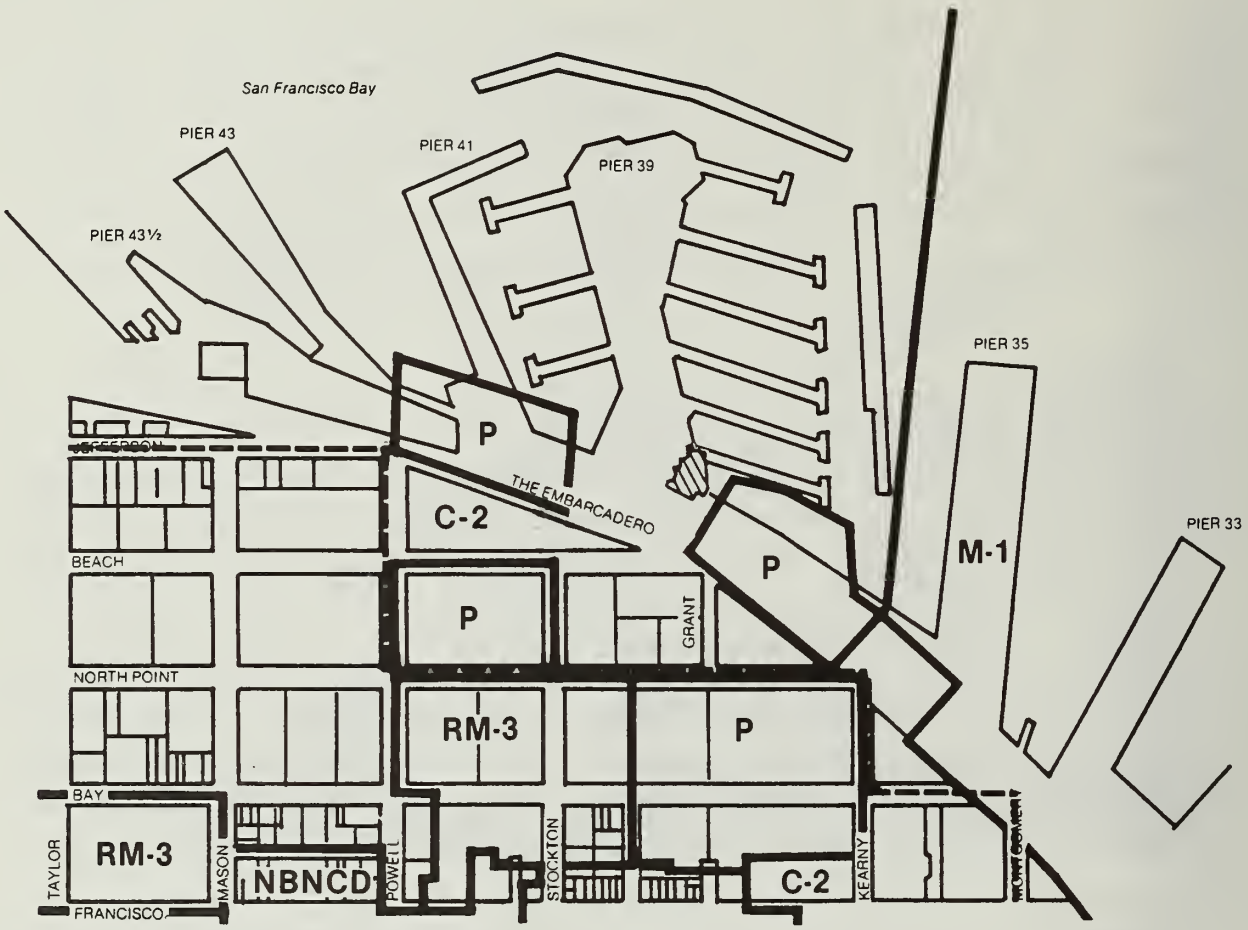
PLANNING CODE USE DISTRICTS

FIGURE 11



LEGEND

P	Public Use
C-2	Community Business
RM—3	Residential, Mixed: Medium Density
	Port of S.F. Jurisdiction
NBNCD	North Beach Neighborhood Commercial District
M-1	Light Industrial

SOURCE: EIP ASSOCIATES

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area exceeds 5,000 square feet. For theatre space, the Code requires one parking space for each eight seats.

Section 152 of the City Planning Code includes requirements for off-street loading for projects in C-2 Districts. One off-street loading space is required for retail business between 10,001-60,000 gross square feet. The off-street loading space must have a minimum length of 25 feet, a minimum width of 10 feet and minimum vertical clearance of 12 feet.

3. SAN FRANCISCO MASTER PLAN CONSIDERATIONS

San Francisco Master Plan

The San Francisco Master Plan contains land use policies which apply to the proposed project. The following objectives and policies of the Commerce and Industry Element and the Northeastern Waterfront Plan Element and the Urban Design Plan apply to the proposed project. The City Planning Commission and other decision-makers will consider the project's compliance with the Master Plan in their review of the project.

Commerce and Industry Element

Objective 3, Policy 1: "Promote the attraction, retention and expansion of commercial and industrial firms which provide employment improvement opportunities for unskilled and semi-skilled workers."

Objective 5, Policy 4: "Avoid actions which may serve to displace desired existing maritime uses."

Objective 5, Policy 7: "Restore the fishing industry in San Francisco."

Objective 10, Policy 1: "Guide the location of additional tourist-related activities to minimize their adverse impacts on existing residential, commercial and industrial activities."

Northeastern Waterfront Plan Element

The Fisherman's Wharf Area, as described in the Plan, is bounded by Van Ness Avenue and Bay Street and includes the piers west of Pier 35. The proposed project would lie on the eastern side of this area.

Overall Goal: "The overall goal of the Plan is to create a physical and economic environment in the Northeastern Waterfront area which will use the area's resources and potential in the manner which will best serve the needs of the San Francisco community." In order to accomplish this goal, the dominant planning principles of this Plan are: "1) provide for those uses which positively contribute to the environmental quality of the area and contribute to the economic health of the Port and the City, 2) preserve and enhance the unique character of the area, and take advantage of the unique economic opportunity provided by San Francisco Bay, and 3) provide the maximum possible visual and physical access to San Francisco Bay while minimizing the adverse environmental impacts of existing and new activity."

Land Use, Objective 2, Policy 1: "Limit additional uses which generate a concentration of activity during the same peak periods, in areas which are heavily impacted with such uses."

Land Use, Objective 2, Policy 2: "Diversify activities to encourage the use of the Northeastern Waterfront by a broad spectrum of the population."

Land Use, Objective 2, Policy 3: "Encourage land uses having different peak periods of activity within each sub-area of the Northeastern Waterfront to contribute to the area's diversity, to expand the period of use, to decrease peak period traffic congestion, to facilitate efficient use of the transit system and to preserve and enhance the environmental quality of the waterfront."

Land Use, Objective 2, Policy 4: "Give priority to the development of public open space in any non-maritime development adjacent to, or over, the water."

Land Use, Objective 2, Policy 5: "Emphasize water-related recreation, Bay-oriented commercial recreation and Bay-oriented public assembly uses in non-maritime development adjacent to, or over, the water."

Urban Design, Policy 3: "Use continuous planting and other ground surface treatment to physically and visually link the waterfront with adjacent inland areas."

Urban Design, Policy 4: "In major pedestrian areas (such as the Fisherman's Wharf and Ferry Building areas), develop generally continuous ground floor retail or other pedestrian-oriented uses."

Urban Design, Policy 5: "Permit non-maritime development bayward of the seawall only if the following qualifications are met: (a) Maximum feasible public access is provided to the water's edge; (b) Important Bay views along the Embarcadero and level inland streets are preserved and improved."

Recreation and Open Space, Policy 5: "Provide overlooks and public viewing areas with convenient pedestrian access wherever possible. Every attempt should be made to provide such viewing facilities in areas of maritime and fish processing activities without interfering with the operation of those activities. Remove bulkhead buildings between piers wherever feasible in order to construct such overlooks and to open views."

Fisherman's Wharf Area, Objective 1, Policy 4: "Encourage a use of materials and design of new and existing buildings and public improvements which enhance the area's historic maritime character. Require that any identification signs be subdued and harmonious with this character. Prohibit garish, flashing and general advertising signs."

Fisherman's Wharf Area, Objective 1, Policy 5: "Encourage the development of a small-boat marina in the Pier 41 to 37 area with any parking provided inland of The Embarcadero."

Fisherman's Wharf Area, Objective 2: "To strengthen the area's attraction as a water-oriented commercial recreation and public assembly center by expanding the area of this

activity to the east, limiting additional concentration of such activities west of Powell Street and developing uses which would generate activity at times other than the existing peak periods."

Fishermans Wharf Area, Objective 2, Policy 1: "Permit additional water-oriented commercial recreation and public assembly (except hotels and boatels) development such as restaurants, entertainment and specialty shops in the Pier 41 to 37 waterfront area in conjunction with a major waterfront park along the seawall. Any necessary parking should be provided inland of The Embarcadero. The park should include a minimum of 5 to 6 acres of water-oriented landscaped open space unrelated to commercial uses. Commercial uses should be water-oriented and complementary in scale to those in the rest of the Fisherman's Wharf area. Platforms constructed to support commercial uses should not cover a greater amount of the Bay than 50% of any previously existing fill (Piers 37, 39 and 41) which is removed. The Embarcadero should be narrowed in this area to accommodate the development of the waterfront park."

Fisherman's Wharf Area, Objective 2, Policy 4: "Balance existing commercial recreation and public assembly uses which generate most activity in summer, on weekends and during the evening, with uses, such as offices and residences, that would generate activity during other periods, thereby promoting the vitality and use of the area without substantially contributing to congestion. In particular, promote the development of housing on inland sites wherever possible."

Fisherman's Wharf, Objective 4, Policy 1: "Develop generally continuous public pedestrian access to the water's edge, excepting areas occupied by maritime activities."

Urban Design Element

The Urban Design Element of the San Francisco Master Plan contains policies and principles which may be used to evaluate the proposed project.

Objective 1, Policy 1: "Recognize and protect major views in the City with particular attention to those of open space and water."

Objective 1, Policy 4: "Protect and promote large-scale landscaping and open space that define districts and topography."

Objective 2, Policy 3: "Avoid encroachments on San Francisco Bay that would be inconsistent with the Bay Plan or the needs of the City's residents."

Objective 3, Policy 5: "Relate the height of buildings to important attributes of the City pattern and to the height and character of existing development. The height of buildings should taper down to the Shoreline of the Bay."

Objective 3, Policy 6: "Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.

4. OTHER ADOPTED ENVIRONMENTAL PLANS AND GOALS

Fisherman's Wharf Action Plan

The Fisherman's Wharf Action Plan (FWAP) (August 1981) contains objectives and policies to guide future development in the area within Port jurisdiction. The proposed project is located on Pier 39, in the area defined by that Plan (shown on Figure 11, page 32). The FWAP discusses Fisherman's Wharf generally and contains specific recommendations for Fish Alley-Hyde Street Pier, Pier 45 and Jefferson Street. As a result of this Plan, several policies were added to the Northeastern Waterfront Plan. An EIR was prepared on portions of the Action Plan (Amendments to the Comprehensive Plan, proposed by the Fisherman's Wharf Action Plan, Final EIR, 81.694E, certified July 14, 1983).

Fisherman's Wharf Action Plan, Objective 2: "To improve the overall economic condition and environmental quality of the wharf and to enhance its attractiveness for residents as well as tourists."

Fisherman's Wharf Action Plan, Objective 3, Policy 2: "Minimize the intensity of automobile traffic and discourage uses which rely heavily on the automobile for their success and generate automobile traffic."

San Francisco Bay Plan/San Francisco Waterfront Special Area Plan No. 1

The San Francisco Bay Plan established San Francisco Bay Conservation and Development Commission's (BCDC) policy on Bay Fill throughout the Bay. The proposed project site is in an area under jurisdiction of BCDC. The area covered by the BCDC San Francisco Waterfront Special Area Plan No. 1 is the land and water area located along the existing shoreline from the Hyde Street Pier to India Basin, including all areas within the jurisdiction of the Port of San Francisco (the line of Port jurisdiction in the project area is shown on Figure 11, page 32).

Both of these plans address the issue of fill in the Bay. As delineated by the McAteer-Petris Act, the State legislation that established the Bay Commission, BCDC can allow fill only for certain defined water-oriented uses and only under the following conditions:

"1. There is no alternative upland location for any fill authorized;

2. The fill is the minimum necessary;

3. The nature, location, and extent of any fill will minimize harmful effects to the Bay;

4. The fill is constructed in accordance with sound safety standards;

5. The fill will, to the maximum extent feasible, establish a permanent shoreline; and

6. The person proposing to fill has sufficient title to the properties in question as to be able to fill it in the manner and for the uses to be approved."[1]

San Francisco Waterfront Special Area Plan No. 1, Piers 37, 39 and 41, Policy 1: "Replacement fill in the area of Piers 37, 39 and 41 should be limited to: a) public recreation and open space in conformance with local plans for the development of a "North Point Park" in this area; and b) Bay-oriented commercial recreation that is complementary to park use (pp. 19-20)."

For a discussion of the current land use planning efforts see page 70.

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[1]Bay Conservation and Development Commission, "Summary of McAteer-Petris Act and Bay Plan Provisions Generally Applicable to the San Francisco Waterfront," Special Area Plan No. 1: San Francisco Waterfront.

B. URBAN DESIGN AND VISUAL QUALITY

Because of the variety of land uses in the area, the size, shape and style of buildings in the Fisherman's Wharf area tend to vary. In general, though, they are low-scale, ranging in height from one to four stories (10 to 40 feet). Within the Pier 39 complex, all buildings are two stories and range between 30 to 40 feet. Some older buildings in the area which have been rehabilitated for commercial uses are long, bulky structures, often encompassing a large portion of an entire block. Ghirardelli Square and the Cannery are such examples. Some of the older buildings in the area used for restaurants or other commercial uses tend to be small (one or two stories tall, with street frontages between 25 and 40 feet long). Small scale developments are also found across from the North Point Shopping Center along Bay Street between Mason and Powell Streets, and on Taylor Street between North Point and Jefferson Streets.

There is larger scale development in the Fisherman's Wharf area, particularly to the west of the project site. The Marriott Hotel, Holiday Inn, Ramada Inn, Sheraton Hotel, Cost Plus building, Liquor Barn building, North Point Shopping Center, North Point Apartment Complex, Travelodge, Pier 39 Garage, the Anchorage Shopping Center, and the Blue Shield building are all developments in the vicinity that rise to approximately 40 feet above the street and that cover all, or a large portion, of their respective project blocks (see Figures 12-18, pages 40 to 46).

The facades of buildings in the area also vary. Brick can be found as a building material in older buildings such as Ghirardelli Square and the Cannery as well as a facade treatment on newer buildings such as the Holiday Inn, the Blue Shield Building and the Cost Plus building. Light-colored stucco, such as that found on the Marriott Hotel building, is also a facade material in the area. Others of the newer buildings in the area, including the Ramada Inn and the Sheraton Hotel, have facades of dark-colored wood siding.

In general, buildings in the area tend to have rectangular shapes, straight roof lines, and relatively little ornamentation, a style typical of older development throughout the Northern Waterfront area. Throughout most of the area, buildings are built out to the

PROJECT AREA PHOTO: VIEW LOOKING NORTHEAST FROM BRIDGE TO PIER 39 GARAGE

FIGURE 12

SOURCE: SQUARE ONE VIDEO

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PROJECT AREA PHOTO: VIEW LOOKING NORTHWEST ALONG THE EMBARCADERO WALKWAY

FIGURE 13

SOURCE: SQUARE ONE VIDEO

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PROJECT AREA PHOTO: VIEW LOOKING NORTHWEST ALONG THE WATERFRONT PROMENADE

FIGURE 14

SOURCE: SQUARE ONE VIDEO

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PROJECT AREA PHOTO:
VIEW LOOKING NORTHEAST ALONG BEACH STREET

FIGURE 15

SOURCE: SQUARE ONE VIDEO

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PROJECT AREA PHOTO:
VIEW LOOKING NORTH WHERE BEACH STREET MEETS THE EMBARCADERO

FIGURE 16

SOURCE: SQUARE ONE VIDEO

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PROJECT AREA PHOTO:
VIEW LOOKING NORTHWEST AT GRANT AVENUE AND THE EMBARCADERO

FIGURE 17

SOURCE: SQUARE ONE VIDEO

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PROJECT AREA PHOTO: VIEW FROM TELEGRAPH HILL

FIGURE 18

SOURCE: SQUARE ONE VIDEO

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property line. The continuous streetscape of these buildings, however, is sometimes interrupted by surface parking lots and service stations set back from the street front. Structures in the immediate project area range in age from about 5 to 75 years.

The pedestrian environment contains an assortment of food and souvenir stands. Approaching the Wharf, the area becomes cluttered with an assortment of signs, many of which are large scale and partially obstruct pedestrian views of the water and fishing activity. Trash receptacles and minimal landscaping are located along most sidewalks.

The existing Pier 39 complex is 30-40 feet high and is of reinforced concrete with wood siding used from previous pier structures. The structure to the east of the entrance adjacent to the project site has an eight-sided design with a long sloping roof and flag pole at the top. This provides a focal point to the entrance to Pier 39 and the landscaped open space surrounding the structure along The Embarcadero.

Pier 39 is visible from points east and west along The Embarcadero. It is especially visible from the west because of surface parking lots and open boardwalk areas extending from Pier 39 to Pier 43 1/2, where there are few objects to obstruct the field of view. From the east, along the Northern Waterfront Park, it is also visible, but becomes increasingly screened because of the masts and rigging of boats rising above the boardwalk level, and trees and shrubs along the Park walkway. Pier 39 is open to view from the pedestrian overpass that extends from the site southwest to the Pier 39 Garage. The pedestrian overpass is elevated about 30 feet above The Embarcadero.

The complex of buildings comprising Pier 39 is visible from vantage points on Telegraph Hill, due south of the site, and to a lesser degree from the more distant Russian Hill. The importance of the octagonal building as an entry focal point to Pier 39, emphasized by its eight sided shape and sloping roof, may be observed from Telegraph Hill.

Views from the project site encompass a variety of visual conditions. To the east and adjacent to the Northern Waterfront Park, boats and yachts tied to their slips emphasize a maritime character within the setting. Boat masts, rigging and antenna rise above the pedestrian walkways providing vertical dimension to the field of view. To the southeast

and southwest, views encompass the blocky structures characteristic of buildings along the Embarcadero as described above, such as the Blue Shield building and Pier 39 Garage. To the west, buildings and restaurants of the Fisherman's Wharf area may be seen in the distance.

C. TRANSPORTATION

Primary intra-city access to and from the project site occurs on North Point Street, Bay Street, Van Ness Avenue, and the Embarcadero, which are designated "Major Thoroughfares" in the Transportation Element of the City's Master Plan. Jefferson Street and Beach Street are identified as recreational streets.[1] Regional access to and from the North Bay is available via the Golden Gate Bridge and U.S. 101 with freeway entrances/exits at the western ends of Marina Boulevard and Richardson Avenue. Regional access to and from the Peninsula and the East Bay is available via the Embarcadero Freeway (I-480) and either U.S. 101 or I-80 (Bay Bridge). Freeway ramps are located at Broadway and Sansome/Battery Streets and on Washington and Clay streets at Davis Street. Bay Street is used as a weekday peak period auto route for travel between downtown San Francisco and the North Bay as well as a primary access route for the Northern Waterfront.

All or portions of Jefferson, Beach, North Point, and Bay Streets and The Embarcadero are designated "Transit Preferential Streets" in the Master Plan.[2]

Sections of Beach and Bay Streets are designated as "Preferred Commute Bicycle Routes" in the Transportation Element of the City's Master Plan. The Embarcadero is a Class I Bikeway; Beach Street is a Class III Bikeway. Bay Street is part of the Preferred Commute Bike Route.

EXISTING TRAFFIC

Existing Levels of service (LOS) and volume-to-capacity ratios (V/C ratios) were computed for eight Northern Waterfront intersections in the weekday and weekend PM peak hours.[3] All study area intersections operate at LOS "A," "B," or "C" during the weekday PM peak hour (5:00 PM - 6:00 PM).

On weekends, three intersections operate at LOS "D" or worse during the PM peak hour (3:00 - 4:00 PM): Powell/Beach (LOS "E"), Powell/Jefferson/The Embarcadero (LOS "E"), and Embarcadero/Beach. At Embarcadero/Beach, the left turn from Beach onto the Embarcadero operates at LOS "F," while the remaining intersection approaches operate at LOS "A."

There is localized congestion along Beach Street and The Embarcadero on weekends during the tourist season. Congestion on The Embarcadero results from long queues of vehicles waiting to enter the Pier 39 garage, heavy pedestrian traffic at the Powell/Jefferson/Embarcadero intersection, and the unusual geometries of this intersection. Heavy traffic entering the study area from the west is the primary cause of congestion along Beach Street. This heavy traffic flow causes substantial delays at the Powell/Beach intersection. The capacity of Beach Street is significantly reduced by the storage of MUNI buses on the southern curb of the street between Powell and Stockton Streets. Figure 19, page 51, shows existing weekday intersection performance and Figure 20, page 52, shows existing weekend intersection performance.

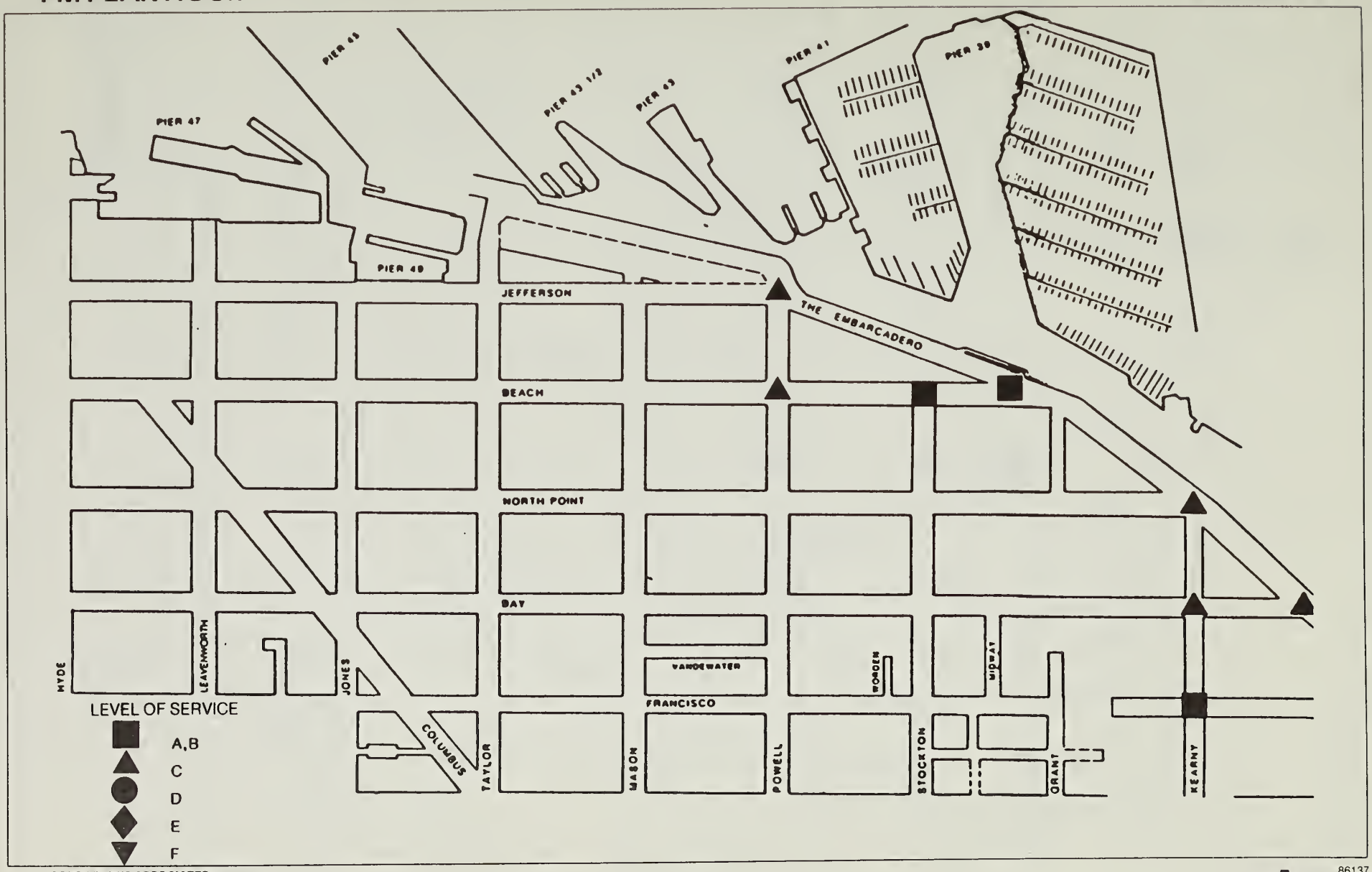
TRANSIT OPERATIONS

One MUNI route, the 32-Embarcadero, directly services the project site along the Embarcadero while four others – the 19-Polk, the 39-Coit, the 15-Third, and the 42-Downtown Loop – all pass within one to four blocks of the project site. The 30-Stockton, the 47-Van Ness/Potrero, the 49-Van Ness Mission pass through or terminate in the Northern Waterfront area, but are too far from the project site to provide convenient access.

The 32-Embarcadero operates between Fisherman's Wharf and the Caltrain depot via The Embarcadero, while the 19-Polk operates between Fisherman's Wharf, the Civic Center, Potrero Hill, and Hunter's Point. The 39-Coit runs between Fisherman's Wharf and Telegraph Hill, and the 15-Third provides service between Fisherman's Wharf, the downtown Financial District, and southern San Francisco via Third Street. The 15-Third terminates in the Northern Waterfront on North Point Street at Mason Street; the 42-Downtown Loop services a closed loop that includes Fisherman's Wharf, the Financial District, the South of Market area, and Van Ness Avenue. The 30-Stockton, which cuts through the Northern Waterfront along Columbus Avenue, operates between the Marina, Chinatown, and the SP Caltrain depot. The 47- and 49-Van Ness routes enter the Western end of the Northern Waterfront along Van Ness Avenue, terminating at North Point Street. All of these lines except the 39-Coit serve BART stations along the Market Street corridor.

EXISTING WEEKDAY INTERSECTION PERFORMANCE
PM PEAK HOUR

FIGURE 19



SOURCE: DKS ASSOCIATES

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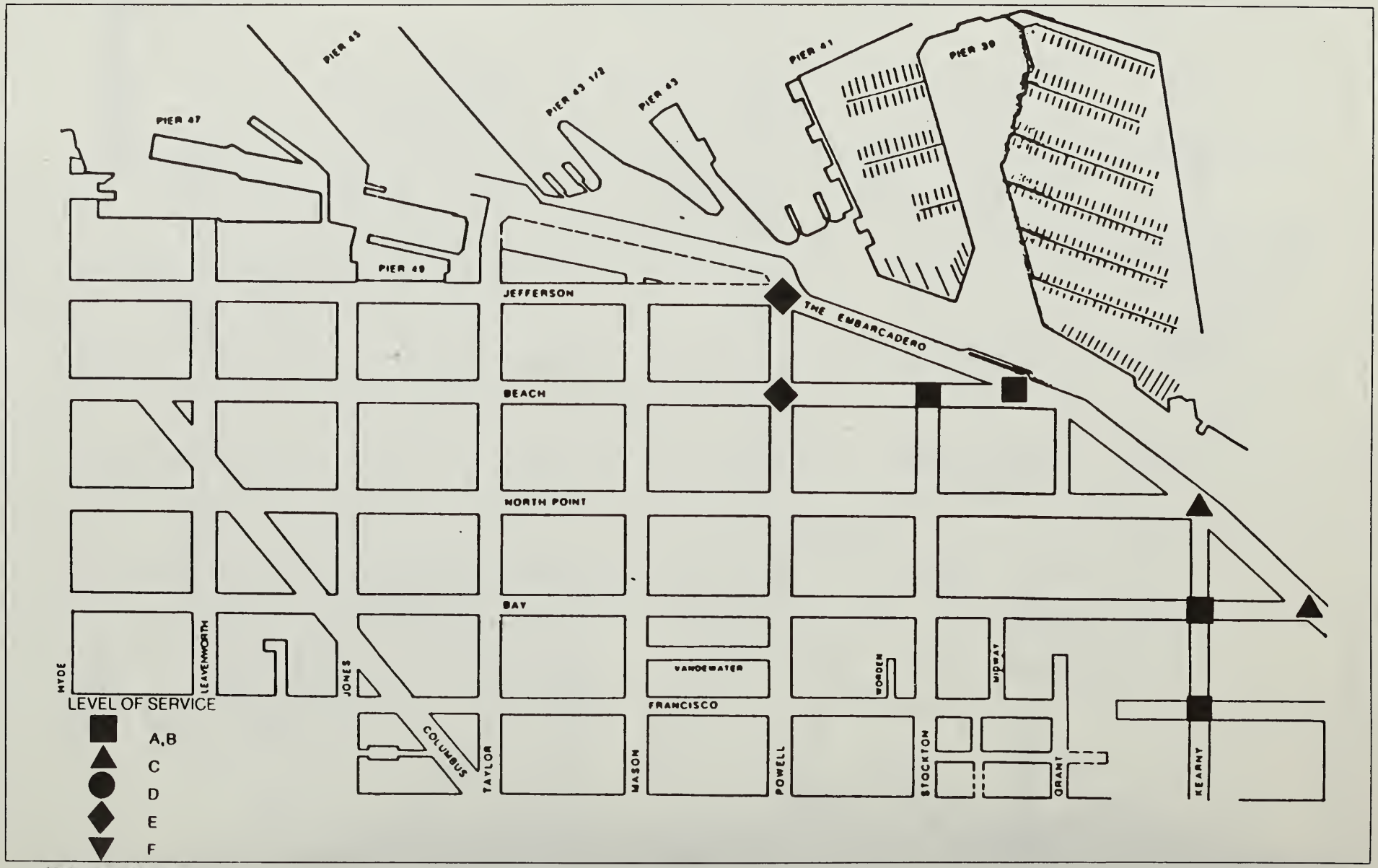
EXISTING WEEKEND INTERSECTION PERFORMANCE
PM PEAK HOUR

FIGURE 20



SOURCE: DKS ASSOCIATES

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In addition to these routes, the Powell-Mason cable car line terminates at the intersection of Taylor and Bay Streets within five blocks of the project site. The cable car serves Fisherman's Wharf, Chinatown, the Union Square shopping area and the Powell Street BART station. Golden Gate Transit operates weekday commute period bus service between North Bay and downtown San Francisco along North Point Street.

Existing transit ridership information indicates that with the exception of the cable cars, transit service within the Wharf is generally underutilized. Weekday PM peak period load factors for the eight Muni lines serving the Wharf average approximately 0.39 passengers per seat. The cable cars on the other hand are very full with a load factor of about 1.77 passengers per seat in the PM peak period.[4]

Specific data were collected regarding cable car ridership on weekends.[5] Patrons were observed boarding and alighting cable cars between 10:00 AM and 6:00 PM at the two terminals located at Beach/Hyde and Bay/Taylor. The peak hourly patronage occurred between 12:00 and 1:00 PM with about 1,760 riders. Additionally, waiting times to board a cable car at the Beach/Hyde turnaround were surveyed. Between 12:00 noon and 6:00 PM, cable car waits ranged between 50 and 65 minutes. Wait times observed at the Bay/Taylor turnaround were somewhat less, averaging between 30 to 45 minutes throughout the survey.

PEDESTRIANS

Based on site visits conducted by DKS Associates during the afternoon of a typical weekend (3:00 - 5:00 PM on a Saturday) and during the PM peak period (4:00 - 6:00) of a typical weekday, the following observations were made.[6]

During the weekday PM peak period (4:00 - 6:00), pedestrian activity west of Pier 39 includes pedestrian flows generally in the unimpeded and impeded range. (Pedestrian Flow Regimes are defined and pedestrian counts are provided in Appendix B.)

East of Pier 39 on weekdays the heaviest pedestrian traffic occurs during the noon hour, when the sidewalk adjacent to the Embarcadero reaches impeded conditions. During the weekday, PM peak period conditions east of Pier 39 are in the open range. The effective

width of these sidewalks (excluding landscaping, parking meters, and other obstructions) is 12 feet east of Pier 39. West of Pier 39 towards Fisherman's Wharf, the total effective sidewalk width is about 40 feet, including the sidewalk adjacent to the street, the sidewalk nearest the water, and the 20-foot wide pedestrian walkway in between these two sidewalks.

The heaviest pedestrian activity in the Northern Waterfront study area occurs on weekends west of Pier 39. Conditions reach impeded range along The Embarcadero between Pier 39 and Powell Street. The Embarcadero north sidewalk at Powell Street is constrained during weekend afternoons. East of Pier 39, weekend pedestrian activity is lower, with conditions in the unimpeded range.

PARKING

Several surveys of weekend parking occupancy have been performed in the Northern Waterfront over the past fifteen years. Recent surveys (1985-86) conducted by San Francisco Department of City Planning[7] indicate that on-street parking is 101% occupied and off-street parking in lots and garages in the Northern Waterfront are 85% occupied on typical Saturdays. Surveys of parking occupancy conducted in 1973, 1976 and 1981[8] in the Fisherman's Wharf area show similar conditions on weekends.

Weekdays off-street parking is generally more available. On-street parking is fully utilized. A survey of on-street parking indicated 98% occupancy during weekday afternoons,[9] while two 1987 weekday off-street parking surveys yielded occupancy rates of 56% and 70%.[10]

The Pier 39 garage, which has approximately 937 parking spaces,[11] was included in the two 1987 surveys. The garage was 61% occupied in the March, 1987 survey with 570 of the 937 spaces occupied. In the July, 1987 survey, the occupancy rate was 86% with 810 of the 937 spaces occupied. On July 5, 1988, a survey was again taken in which it was found that 774 of the 937 spaces were occupied, or 83%.

On-street parking conditions were surveyed in the areas immediately south of the Northern Waterfront. During weekday afternoon, weekday night and weekend afternoon

periods, on-street parking was found to be fully utilized. There is no underutilized on-street parking within the Northern Waterfront and on its perimeter. As vehicles leave spaces, they are immediately taken, indicating a large latent demand for the convenience and low cost of this parking.

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[1] A Major Thoroughfare is defined as a crosstown thoroughfare whose primary function is to link districts within the City and to distribute traffic from and to freeways. The route is generally of city-wide significance.

[2] Department of City Planning, City and County of San Francisco, Transportation: An Element of the Master Plan, January, 1983. Transit Preferential Street is defined as an important street for transit operations where interference with transit vehicles by traffic should be minimized.

[3] Traffic counts conducted by DKS Associates, 1986 and 1987.

[4] Based on conversations and data provided by Bill Wycko and Rebecca Kohlstrand, San Francisco Department of City Planning, August, 1986. Bus boarding and alighting data based on route profile reports prepared for MUNI, Spring, 1984 and Department of City Planning Board and Alighting Counts, Spring, 1986. The cable car system was not in operation in Spring, 1984. Cable car data from MUNI Information Office and Department of City Planning.

[5] Cable Car Survey conducted by DKS Associates, March 29, 1986.

[6] Site visits and pedestrian counts made by DKS Associates on March 26, 1986; March 29, 1986; March 18, 1987; March 21, 1987; July 9, 1987; August 8, 1987.

[7] Surveys conducted by San Francisco Department of City Planning, 1985-86, provided by Bill Wycko, transportation planner, Department of City Planning, January, 1987. Surveys show 1,590 on-street parking spaces and 4,875 off-street spaces in the Northern Waterfront study area.

[8] North Point Park/Marina Final EIR, EE74.368, San Francisco Department of City Planning, Certified August, 1976, pages 83 and 84. Data for 1973 from:

- "A Study of Vehicular and Pedestrian Traffic in the Fisherman's Wharf Area," Fisherman's Wharf Merchants Association, by Robert E. David, September 18, 1973. Indicated parking was a problem at peak periods, but somewhat available during weekdays.

Data for 1976 from:

- San Francisco Department of Public Works and Department of City Planning surveys made on the weekend after Labor Day, 1975 and on a weekday during the same week. Indicated that on-street parking had very high occupancy rate on weekdays and weekends. Also found that off-street parking had relatively high occupancy, although some lots in the central area of Fisherman's Wharf had lower occupancies.

Data for 1981 from:

- Fisherman's Wharf Action Plan: Transportation Impact Analysis, Case Study No. 81.694E, San Francisco Department of City Planning, by DKS Associates, January, 1982. Indicates that on- and off-street parking was over 90% occupied.

[9]Survey conducted by EIP Associates, May 25, 1985. The survey found 872 cars parking in 891 on-street spaces in the central portion of the Northern Waterfront.

[10]Surveys conducted by DKS Associates, March 23, 1987, and July 9, 1987. The March survey indicated 56% occupancy, and the July survey found 70% occupancy.

[11]Survey count conducted by DKS Associates on July 5, 1988. The survey counted 919 striped parking spaces and 18 unstriped spaces (located on the first floor on the southeast corner).

D. AIR QUALITY

The Bay Area Air Quality Management District (BAAQMD) operates a regional monitoring network that measures the ambient concentrations of six air pollutants: ozone (O3), carbon monoxide (CO), total suspended particulates (TSP), lead (Pb), nitrogen dioxide (NO2), and sulfur dioxide (SO2). On the basis of the monitoring data, the Bay Area, including San Francisco, currently is designated a non-attainment area with respect to the federal ozone and CO standards. A three-year summary of the data collected at the BAAQMD monitoring station nearest the project sites (about four miles southeast at 900 23rd Street) is shown in Appendix C, page A-49, together with the corresponding federal and/or state ambient air quality standards. In 1987, there was one violation of federal and State eight-hour CO standards. In 1986, there were two violations of the federal and State eight-hour average CO standard and five violations of the previous state 24-hour average TSP standard. In 1985, there were three violations of the State and federal eight-hour CO standard, and five violations of the previous state 24-hour average TSP standard.[1]

BAAQMD has conducted several CO "hotspot" monitoring programs in the Bay Area, including two in San Francisco. One CO monitoring program was conducted during the winter of 1979-80 and included the intersection of Washington and Battery Streets in San Francisco, about one mile southeast of the site. The high eight-hour average concentration was 10.1 ppm, which violated the 9-ppm state and federal standards by 1.1 ppm. The high one-hour average concentration of 15 ppm did not violate the 20-ppm state standard or the 35-ppm federal standard. Another CO monitoring program was conducted during the winter of 1980-81 and included the San Francisco intersections of Geary and Taylor Streets, about 1.3 miles south of the site, and 100 Harrison Street at Spear, about two miles southeast of the site.[3] At Geary and Taylor the observed high eight-hour average concentration was 11.5 ppm, which violated the standards by 2.5 ppm, and the high one-hour concentration was 15 ppm, which did not violate the standards. At Harrison Street the observed high 8-hour and 1-hour average concentrations were 7.8 ppm and 13 ppm, respectively, which did not violate the standards. In December 1985, the City monitored CO and counted traffic at the Sixth and Brannan intersection. The preliminary analysis corresponds closely to the baseline data used when CO was modeled for this project. These data from the "hot spot" monitoring programs indicate that locations in

San Francisco near streets with high traffic volumes and congested flows may experience violations of the eight-hour CO standard under adverse meteorological conditions.

Comparison of these data with those from other BAAQMD monitoring stations indicate that San Francisco's air quality is among the least degraded of all the developed portions of the Bay Area. Three of the four prevailing winds, west, northwest, and west-northwest blowing off the Pacific Ocean reduce the potential for San Francisco to receive pollutants from elsewhere in the region.

San Francisco's air quality problems, primarily CO and TSP, are due largely to pollutant emissions from within the City. CO is a non-reactive pollutant and its major source is motor vehicles. CO concentrations are generally highest during periods of peak traffic congestion. Particulate levels are relatively low near the coast, increase with distance inland, and peak in dry, sheltered valleys. The primary sources of particulate in San Francisco are demolition and construction activities, and motor vehicle travel over paved roads.

San Francisco contributes to regional air quality problems, including ozone, which affect other parts of the Bay Area. Ozone is not emitted directly from sources, but is produced in the atmosphere over time and distance through a complex series of photochemical reactions involving hydrocarbon (HC) and nitrogen oxide (NOx) emissions, which are carried downwind as photochemical reaction occurs. Ozone standards are violated most often in the Santa Clara, Livermore, and Diablo Valleys, because local topography and meteorological conditions favor the buildup of ozone and its precursors.

In 1982, motor vehicles were the source of 86% of the CO, 46% of the hydrocarbons (HC), 44% of the TSP, and 56% of the nitrogen oxides (NOx) emitted in San Francisco, while power plant fuel combustion was the largest single source of sulfur oxides (SOx), about 33% of the total.[4] These percentages are expected to apply reasonably well to current conditions.

In response to the Bay Area's ozone and CO nonattainment designations, the Association of Bay Area Governments (ABAG), BAAQMD, and the Metropolitan Transportation

Commission (MTC) prepared and adopted the 1982 Bay Area Air Quality Plan, which establishes pollution control strategies to attain federal ozone and CO standards by 1987 as required by federal law.[5] These strategies were developed on the basis of detailed subregional emission inventories and projections, and mathematical models of pollutant behavior, and consist of stationary and mobile source emission controls and transportation improvements. The BAAQMD, MTC, and California Bureau of Automotive Repair (a state agency) have primary responsibility for implementation of these strategies.

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[1] State standards for particulate matter changed in 1983 and federal standards changed in 1987 to concentrate on fine particulate matter which has been demonstrated to have health implications when inhaled (PM-10). The previous state and federal particulate standards were 100 micrograms per cubic meter (ug/m^3) and 260 ug/m^3 of particulates, respectively. The present state and federal PM-10 standards are 50 ug/m^3 and 150 ug/m^3, respectively, of fine particulate matter. Although both the previous and present particulate standards are measured in ug/m^3, under the PM-10 standards only those particulates 10 microns or less in size are measured. The BAAQMD (Thomas Perardi) has stated that TSP includes about 50% to 60% of particulates of 10 microns or less; thus, the TSP standards are generally equivalent to the PM-10 standards. BAAQMD is presently monitoring PM-10 at seven Bay Area monitoring stations, including the 16th and Arkansas station in San Francisco.

[2] Association of Bay Area Governments, AQMP Tech Memo 33, "Summary of 1979/1980 Hotspot Monitoring Program," Berkeley, California, June 1980.

[3] Association of Bay Area Governments, AQMP Tech Memo 40, "Results of the 1980/1981 Hotspot Monitoring Program for Carbon Monoxide," Berkeley, California, January 1982.

[4] Bay Area Air Quality Management District (BAAQMD), Base Year 1982 Emissions Inventory Summary Report, San Francisco, California, November 1, 1983.

[5] Association of Bay Area Governments (ABAG), BAAQMD and MTC, 1982 Bay Area Air Quality Plan, Berkeley, California, December 1982.

E. WATER QUALITY & MARINE BIOLOGY

SETTING

Existing Water Quality

Water quality in the Bay near Pier 39 during dry weather is in compliance with applicable water quality standards. During severe storms the bacterial content of nearshore waters rises as a result of combined sewer overflows; the appearance of waters may also be impaired.

Regulation of Water Quality

The government agency with primary responsibility for protecting the health of San Francisco Bay is the Regional Water Quality Control Board, San Francisco, Bay Region. The Board has prepared a water quality control or "basin" plan that serves as a blueprint for water pollution control activities in San Francisco Bay. The basin plan identifies a number of uses of San Francisco Bay that must be protected. These uses, referred to as beneficial uses, are non-contact recreation, wildlife habitat, preservation of rare and endangered species, estuarine habitat, warm freshwater and cold freshwater fish habitat, fish spawning and migration, industrial service supply, navigation and commercial and sport fishing. To protect the beneficial uses the Regional Board establishes water quality objectives and requires dischargers to San Francisco Bay to meet certain effluent limitations which will result in compliance with the objectives.

The current San Francisco Bay Water Quality Control Plan (Basin Plan) amendments recently adopted by the San Francisco Regional Water Quality Control Board (RWQCB) define water quality objectives to protect and enhance defined beneficial uses. The amendments are currently under review by the State Water Resources Control Board (SWRCB) and may be approved or revised by the SWRCB.

The primary impact of the Basin Plan amendments is more stringent water quality requirements and effluent limitations for the discharge of toxic pollutants, particularly heavy metals and cyanide.

Water Quality Objectives

Water quality objectives or standards have been established by the RWQCB for the waters of San Francisco Bay. These objectives describe the level of water quality which should exist to protect and enhance the defined beneficial uses such as fish habitat and recreational use. In establishing relevant objectives, consideration is given to the expected water uses, any adverse effects of not attaining the established objectives, the capability of controlling water quality to permit all expected uses, and the administrative and institutional aspects of water quality control. Water quality resulting from attainment of the established objectives must be sufficiently high to ensure protection for all designated current and potential beneficial uses. The RWQCB recognizes that too little information exists in some cases to establish definitive objectives, but believes its conservative approach to setting objectives is proper. These objectives are achieved primarily through the establishment and enforcement of effluent limitations (waste discharge requirements) through the implementation of the Basin Plan.

In general, the objectives are intended to govern the concentration of pollutant constituents in the main water mass. The same objectives cannot be applied at or immediately adjacent to submerged effluent discharge structures. Zones of initial dilution within which higher concentrations can be tolerated are allowed for such discharges.

Water quality objectives are determined under what is known as an anti-degradation policy. Whenever the existing quality of water is better than the quality of established objective, such existing quality must be maintained unless otherwise provided by State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," including any revisions thereto. This is commonly called the Anti-degradation Policy and it applies to all waters of the Basin.

Effluent Limitations

To ensure that water quality objectives are adhered to, the RWQCB establishes effluent limits for all discharges to the waters of region as shown in Table 4, page 62. The effluent limits are included as conditions in discharge permits issued as part of the

TABLE 4

GENERAL EFFLUENT LIMITS FOR DISCHARGE TO SAN FRANCISCO BAY

Constituent	Limit
Biochemical Oxygen Demand	30[1]
Suspended Solids	30[1]
Coliform Organisms	240[2]
Oil and Grease	10[1]
pH	6-9[3]
Residual Chlorine	0

[1] Monthly average expressed n milligrams per litre (mg/l).

[2] Median value of five samples assuming that the discharge is subject to a minimum of 10:1 dilution in the receiving water.

[3] Monthly average expressed in pH units, the negative logarithm of hydrogen ion concentration.

Source: Regional Water Quality Control Board, San Francisco Bay Region.

National Pollutant Discharge Elimination System (NPDES). Effluent limits for conventional pollutants are shown in Table 4, above. Effluent limits for toxic materials are shown in Table 5, page 63.

Effluent limitations have been established by the RWQCB to achieve the water quality objectives. The RWQCB will consider establishing more stringent limitations or limitations for other constituents as necessary to meet water quality objectives and protect beneficial uses in particularly sensitive areas. Similarly, the RWQCB will consider establishing less stringent limitations, consistent with other State and Federal laws, for any discharge where it can be conclusively demonstrated through a comprehensive program approved by the RWQCB that such limitations will not result in unacceptable adverse impacts on the beneficial uses of the receiving water. Such a comprehensive program must evaluate the impact of other, nearby discharges as well as the discharge itself.

TABLE 5

TOXIC MATERIAL EFFLUENT LIMITATIONS[1]
FOR DISCHARGE TO SAN FRANCISCO BAY μg/1

Constituent	Shallow Water Limiting Concentration	Deep Water Limiting Concentration
Arsenic	20	200
Cadmium	10	30
Total Chromium	11	110
Copper	20	200
Lead	5.6	56
Mercury	1	1
Nickel	7.1	71
Silver	2.3	23
Zinc	58	580
Cyanide	25	25
Phenolic Compounds	500	500

[1]24-hour average concentrations expressed in micrograms per liter (μg/1).

Source: Regional Water Quality Control Board, San Francisco Bay Region.

F. GEOLOGY/TOPOGRAPHY

The elevation at the project site is +2.4 feet San Francisco Datum (SFD).[2] As indicated on the materials maps of San Francisco Bay, the soil on the bottom of the bay in the vicinity of the project site consists of Upper Bay Mud about 40 feet thick. The thickness of Lower Bay Clay underlying the Upper Bay Mud is about 100 feet. It is, in turn, underlain by bedrock at about -150 feet SFD.[3]

The Upper Bay Mud (also referred to as the Younger Bay Mud) consists of compressible clays, silts and sands of marine and terrestrial origin. The mud is soft and plastic when wet; it shrinks and becomes brittle upon drying. It contains up to 65% water. The solids range between 45% and 95% clay-sized particles, the remainder being silt, fine sand and fragments of shells. The fine sand occurs in lenses and layers that may be several inches to several 10's of feet thick and vary in density from very loose to extremely dense. The top part of the unit is very soft. At greater depths, it becomes semi-consolidated, but it remains soft.[3]

The Lower Bay Clay is a firm silty clay, containing varying amounts of sand and fine gravel. It contains much less moisture than the Upper Bay Mud, having been overconsolidated (squeezed) by the weight of glacial ice and overlying sediments, drying after deposition, chemical reaction and seismic vibration. It is very dense, being considerably less compressible than either the upper or lower member of the Upper Bay Mud and is considered good pile foundation support material for all but heavy, concentrated loads.[3]

The Franciscan Assemblage bedrock consists of clay and silt deposited in a deep sea basin, about 140 million years ago, as submarine mud flows and landslides. The material was consolidated into shales and sandstones, broadly deformed and sheared by ancient faults, folded into chert deposits and intruded by igneous petrothermal materials that cooled into rocks similar to lava flows. The Franciscan rocks beneath the project site probably are sandstone or shale with sandstone interbeds. Both units have high shear strength, high seismic stability and moderately high static stability (resistance to landsliding).[4]

The subsurface materials encountered at the site during the preliminary geotechnical investigations included 25 to 51 feet of Bay Mud overlying and partially interbedded with 10 to 18 feet of Recent Bay Deposits (silty and clayey, fine to coarse sand with shells). Beneath the Bay Mud 57 to 93 feet of interbedded clays and sands were encountered before reaching Franciscan shale at depths between -123 and -164 feet SFD. The clay/sand series represents the Lower Bay Clay interbedded with very densely consolidated coastal and estuary sands. The sand probably does not represent the Colma Formation (encountered in near-shore and on-shore borings in San Francisco), but is likely to be alluvial or estuarine in origin. It is moderately dense near the base of the Bay Mud and very dense near the surface of the Franciscan bedrock.[5]

The project site is in a Special Geologic Study Area as designated in the Community Safety Element of the San Francisco Master Plan.[6] The site would experience violent groundshaking during a great earthquake (Richter Magnitude M 8.0+) along any of the active fault zones surrounding the City.[4] The site is in an area of potential liquefaction, subsidence, differential settlement and lateral spreading.[7]

Foundation support and aquarium drainage also are potential sources of geologic/hydrologic-related problems in the project area. Fault rupture, landsliding and reservoir-related flooding are not hazards in the vicinity of the proposed project.[6]

Potential inundation hazard derives from the 500-year Tsunami event. Tsunamis, or great sea waves, can be generated by any large-scale, short-duration disturbance of the ocean floor.[8] An undersea earthquake greater than M 6.5 which occurs less than 32 miles below the sea floor is capable of causing a tsunami. Earthquakes caused by faults which experience principally horizontal movement, such as the faults offshore of the San Francisco Bay Area, are not considered likely to produce tsunamis. Tsunamis from distant sources usually produce a rapidly rising tide (rather than a great wave) along the coast of California. Consequently, the Bay Area would be in greater danger from local flooding than from the impact force of a great wave.[9] Tsunami inundation data published by the U.S. Army Corps of Engineers indicates projected runups in the area would reach -2.4 feet SFD during the 100-year tsunami and +2.5 feet SFD during the 500-year tsunami.[10,11] The 100-year level is lower than the surface elevation on the project site (+2.4 feet SFD).

Assuming a worst case situation of the tsunami occurring during maximum high tide, the 100-year runup would reach +5.0 feet SFD and the 500-year runup would reach +9.9 feet SFD or about 7.5 feet above the base level at the site.[12]

Subsidence, or the sudden sinking of the ground surface with little or no horizontal motion, can occur during earthquake-induced groundshaking because the vibrations can cause compaction of loose fill. The compaction is not uniform and causes the fill to settle at different rates. Fill was dumped along the north and east tidal flats of San Francisco to provide flatland as early as 1850.[4] Most of this fill was not engineered and is subject to compaction. However, in the vicinity of the landward portion of Pier 39, the fill consists of about 30 feet of fine to medium sand, rock fragments and rock fills that are part of the 1869 seawall and the 1880 seawall and bulkhead. The seawalls are founded on firm sand below a thin layer of Bay Mud.[13] There is no way to predict precisely the future behavior of such material; however, differential settlement is inevitable only when loose fills, used as supporting soils, are subjected to seismic loading. Structures supported on such fill would be damaged or destroyed during the settling process. Fill placed over Bay Mud for use as foundation support also is subject to gradual subsidence caused by readjustment of the mud under heavier surface loads. The sinking that results is not as sudden as earthquake-induced subsidence, but eventually can be just as damaging.[13] The rock fill would not be expected to subside because it has compacted through its own weight, as well as seismic vibration during the 1906 earthquake.

Liquefaction can be induced by groundshaking in loose, water-saturated fine sand. The vibrating action caused by the earthquake turns the soil/water mixture to quicksand. Any structure supported on the soil would tilt or sink. As with subsidence, the process does not occur uniformly and the structure's foundations would be strained, thus damaging or destroying the structure.[7]

Lateral spreading or plastic flow of Bay Mud can be initiated by major earthquakes. Mud waves caused by earthquakes are elastic ripples created on the mud surface, but are not permanent features. Lateral spreading involves a permanent horizontal deformation of the mud that is similar to dough being spread on a breadboard. Any structure supported on the mud would sink as the mud spreads. In worst-case conditions a structure could be overturned by the uneven loss of foundation support (differential settlement).[14]

[1]Copies of the documents cited in these footnotes are on file at the San Francisco Department of City Planning, 450 McAllister Street, San Francisco, California 94102.

[2]San Francisco Datum (SFD) established the City's "0" point for surveying purposes at approximately 8.6 feet above mean sea level (msl). Elevations in this report and the cited documents are given with respect to this datum.

[3]H.B. Goldman, "Geology of San Francisco Bay," in Geologic and Engineering Aspects of San Francisco Bay Fill, California Division of Mines and Geology, Special Report 97, 1969, pages 9 to 30 and plates 1 to 4, scale 1:80,000.

[4]J. Schlocker, Geology of San Francisco North Quadrangle, California, U.S. Geological Survey, Prof. Paper 782, U.S. Government Printing Office, Washington, D.C., 1974, Plates 1 and 3 (scale 1:24,000), and Table 11. Active faults in the Bay Area (shown on Figure 1) are the San Andreas fault, about 7 miles west of the project, the Hayward fault, about 10 miles east of the project, and the Calaveras fault, about 20 miles east of the project.

[5]Well logs provided by Kaldveer Associates, Geoscience Consultants, 20 April 1988, from Project No. K232-6.

[6]City of San Francisco, Department of City Planning, San Francisco Master Plan, Community Safety Element, adopted September 12, 1974, pages 6 through 11.

[7]URS/John A. Blume and Associates, San Francisco Seismic Safety Investigation, San Francisco, California, June 1974, Figures 3, 4, 5, 7, 9 and 10.

[8]Tsunamis: Long-period waves generated by earthquakes, undersea landslides or volcanoes; upon reaching the shallow water of coastal areas, the waves greatly increase in height and may cause localized flooding. Office of Environmental Review, Standard Definitions, San Francisco, California, November 15, 1979.

[9]Diane Pierzinski, Environmental Planner, Department of Conservation, "Tsunamis," California Geology, Sacramento, CA, March 1981, pages 58 and 59.

[10]A 100-year run-up event is one that is equaled or exceeded with an average frequency of once every 100 years; and 500-year runup has a corresponding definition. A. Garcia and J. Houston, Type 16 Flood Insurance Study, U.S. Army Corps of Engineers, Technical Report, H-75-17, Washington, D.C., November 1975, page 4.

[11] A. Garcia and J. Houston, Type 16 Flood Insurance Study, Washington D.C., U.S. Army Corps of Engineers, Technical Report #H-75-17, November 1975, Figure 55. Elevations given in msl datum were converted to SFD for this report.

[12] The maximum high tide level of 7.5 feet above mean lower low water includes a +0.2 foot correction factor for the nearest tidal gauge (at Pier 41). This tide level actually occurred on December 11, 1985. Mean lower low water is about -13 feet SFD. 1985 Tide Tables, San Francisco Edition published by F. S. Elliott Sales Corporation, Tacoma, WA.

[13] City of San Francisco, Department of City Planning, EIR, Proposed North Point Park/Marina, San Francisco California, EE75.368, SCH #76062820, certified August 26, 1976, pages 33 through 40.

[14] C.H. Lee and M. Praszker, "Bay Mud Developments and Related Structural Foundations," Geologic and Engineering Aspects of San Francisco Bay Fill, California Division of Mines and Geology, Special Report 97, 1969, pages 41 to 86.

G. NOISE

The noise environment of the site, like that of downtown San Francisco in general, is dominated by vehicular traffic noise. The nearest residences are approximately 800 feet south of the site on the south side of North Point Street.

IV. ENVIRONMENTAL IMPACTS

INTRODUCTION

An application for an environmental review of the proposed project was filed on December 4, 1986. An Initial Study of the proposed project was published on January 29, 1988 and it was determined that an Environmental Impact Report (EIR) was required. The Initial Study concluded that the following issues required no further study since they would either have insignificant impacts or the impacts would be mitigated to insignificant levels through mitigation measures included in the building design or committed to in the Initial Study: light and glare, population, wind, shadows, operational noise, construction-generated air quality, odors, utilities/public services, endangered species, historical and cultural resources, energy, and hazards. Therefore, this EIR does not discuss the above issues. The Initial Study is incorporated as Appendix A, pages A-3 to A-30 and may be referred to for discussion of these issues.

Not all of the impacts discussed in this section are physical environmental effects as defined by the California Environmental Quality Act (CEQA). They are included for informational purposes only.

A. LAND USE, ZONING AND BAY FILL

1. LAND USE

The existing pier has a footprint of 261,676 square feet (from the seawall) and contains approximately 198,000 square feet of small-scale retail, restaurant and theatre uses. The proposed project would add 19,400 square feet to the footprint of Pier 39 (for a total of 281,076 square feet) and 41,100 net new gross square feet (for a total of 239,100 gross square feet). About sixteen boat slips in the marina would be removed and any boats in those slips would be relocated to one of the approximately 50 vacant slips in the Pier 39 marina. See Table 1, page 13 and Table 3, page 16.

The proposed aquarium would contain a total of 48,200 gross square feet (gsf) including lobby and public circulation (2,800 gsf), a book shop (2,200 gsf), office and staff space (3,800 gsf), exhibit areas (6,300 gsf), function room and service area (2,350 gsf), a large tank (9,500 gsf), service area (1,550 gsf), tank service areas (3,800 gsf), and ancillary space (15,900 gsf).

Approximately 3,600 square feet of the existing building would be removed which currently contains amusement rides and games. The net increase of space would be 41,100 square feet. Table 2, page 15, summarizes the proposed project characteristics.

The proposed project would result in the net loss of approximately 2,400 square feet of landscaping, 500 square feet of pedestrian pavement and 800 square feet of covered open space. The proposed project would result in the net addition of 300 square feet of service area and 1,500 square feet of roadway, which extends around the entire Pier 39 development. Table 6, page 72, summarizes the changes in intensity of open space land adjacent to Pier 39. Figures 21A and 21B, pages 73 and 74 show these changes graphically. The perimeter access road/pedestrian walkway would be relocated around the new construction. The project sponsor proposes to mitigate this impact by improving the resulting open space and other Pier 39 open space. These improvements would include: 1) Installation of six protected pedestrian overlooks, cantilevered over water from the existing and relocated perimeter walk/roadway. These pedestrian overlooks would include benches, viewfinders, special low night lights, and special displays on the content of the important visual landmarks, and other pedestrian amenities, 2) Protecting the pedestrian space from vehicles at the north end of the pier by the installation of bollards, and 3) Expansion of the open deck on the second floor, located on the north end of the pier.

Land Use Planning Context

The Northern Waterfront has been the subject of much recent study by the Department of City Planning (DCP) and other agencies, and considerable discussion by area business people and residents. This ongoing examination may result in changes to the planning and regulatory context which is described in the Land Use Setting section of this EIR. The DCP has gathered data and developed forecasts of future impacts of land use

TABLE 6

PROJECTED CHANGES IN SITE COVERAGE RESULTING FROM PROPOSED AQUARIUM
(In Gross Square Feet)

	Existing	Proposed	Net Change
Enclosed Building	4,100	25,400	+21,300
Covered Open Space[1]	2,900	2,100	-800
Landscaping	6,700	4,300	-2,400
Pedestrian Pavement	11,000	10,500	-500
Roadway	6,200	7,700	+1,500
Service Area	1,100	1,400	+300
Open Water Surface	19,400	0	-19,400
TOTAL AREA[2]	51,400	51,400	0

[1]Covered Open Space is defined as those areas open to public access and covered by a roof overhang or upper story building.

[2]This delineated area of 51,400 square feet is arbitrary and was identified for the purposes of tracking changes in open space area around the project site.

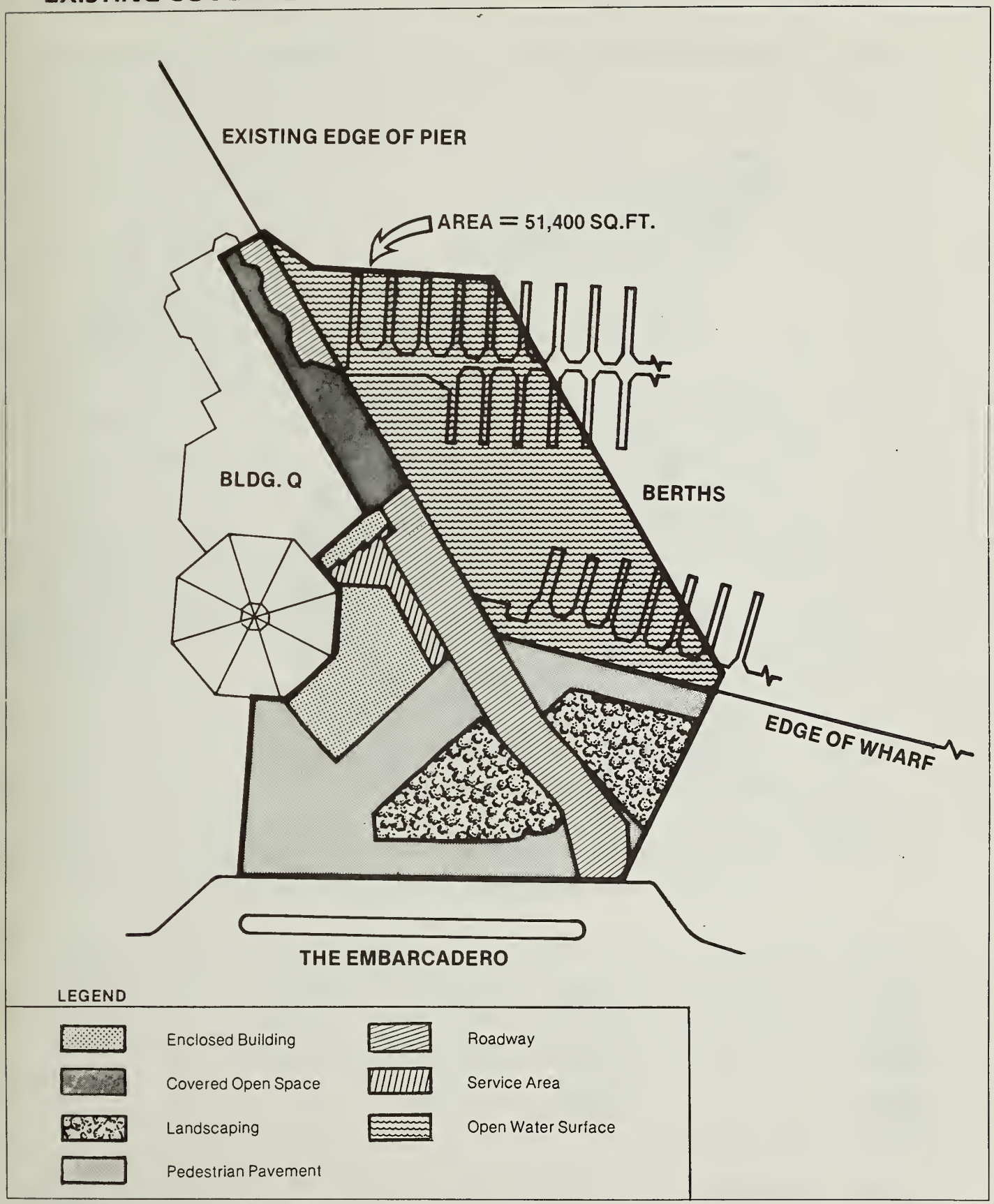
Source: Esherick, Homsey, Dodge and Davis; EIP Associates

developments in the course of its ongoing study of conditions in the area, and in environmental review documents prepared for other proposed projects. This information is used in this EIR (particularly in the transportation setting and impacts sections) in order to assure that the cumulative impacts of potential development are fully addressed, and that the possible directions of land use policy in the area are described.

In March 1987, DCP published The Northern Waterfront Findings Report, which examines the area generally bounded by Van Ness, North Point, Columbus, Francisco, Kearny and the Bay. That report includes a description of existing conditions in the area including population, land use and transportation patterns, as well as consideration of urban design and historic preservation issues. It includes an examination of important issues and

PROPOSED CHANGES IN SITE COVERAGE
EXISTING COVERAGE

FIGURE 21A



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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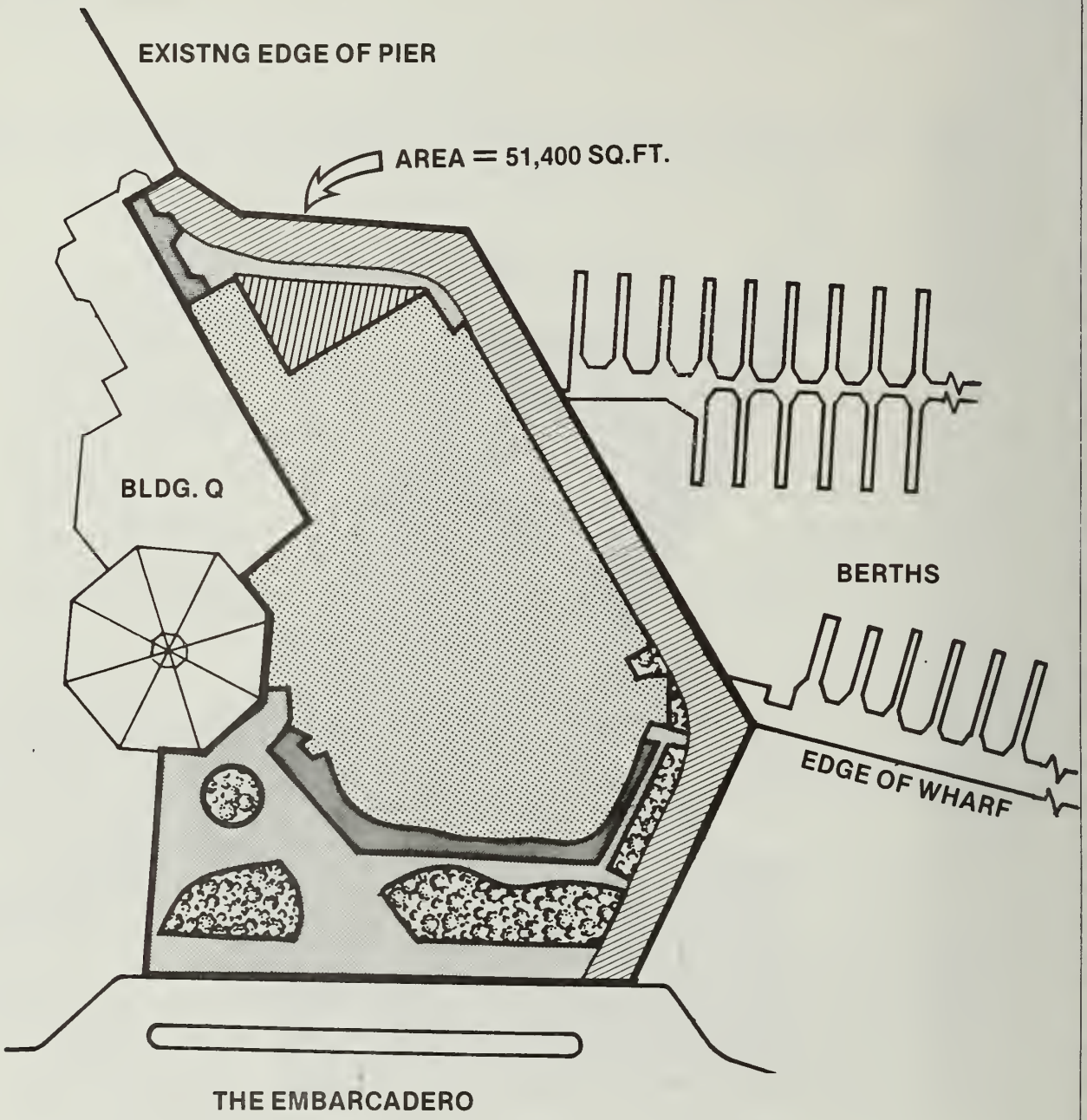
PROPOSED CHANGES IN SITE COVERAGE
PROPOSED PROJECT

FIGURE 21B



LEGEND

	Enclosed Building		Roadway
	Covered Open Space		Service Area
	Landscaping		Open Water Surface
	Pedestrian Pavement		

SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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opportunities, and a discussion of strategies which could be taken by public agencies to solve current problems. The report suggests that the Fisherman's Wharf area is "losing its attraction because of physical deterioration and lack of an identity and unified image." This is due to a continued decrease in fishing related industry, contrasted with an increase in tourist-oriented businesses, with resulting traffic and parking congestion. The Report drew on consultants' analyses of transportation (described below) and of the area's hotel market.

In conjunction with The Northern Waterfront Findings Report, a transportation analysis was published which was prepared by a private consultant under the direction of the DCP (DKS Associates, Northern Waterfront Traffic and Transportation Study). This study analyzed the impacts of three possible scenarios of future development in the area, each of which would be possible under current zoning. The scenarios, which were developed by the DCP, included one which emphasized hotel/retail development ("A"), one which emphasized office/retail development ("B") and one which emphasized housing/office development ("C"). The amount of potential future land use change under each scenario was estimated from an analysis of "soft sites" -- those sites where future development would be most likely to occur in the next 15 to 25 years. The three scenarios are described in more detail in the Northern Waterfront Traffic and Transportation Study. The scenario analysis is not an economic forecast of development over a specific time frame as was contained in the Downtown Plan EIR (EE81.3, certified October 18, 1984), nor is it a list of currently proposed projects. It is not sensitive to short-term changes in existing land use. The scenario analysis methodology was used in the Northern Waterfront Traffic and Transportation Study (and is being used in this EIR) to provide a reasonable context of future development possible under existing zoning, against which the proposed project can be reviewed and evaluated by the public and decision-makers.

The Super 8/Clarion Hotel Environmental Impact Report (85.111E/85.114E, certified October 22, 1987) was prepared for two proposed hotels in the Fisherman's Wharf Area. That EIR considered cumulative transportation impacts, and resulted in some updates on the analysis in the Northern Waterfront Traffic and Transportation Study due to changing conditions.

A Redevelopment "survey area" was designated on the Northern Waterfront in December 1987. The survey area includes the area generally bounded by Van Ness Avenue, North Point Street, Columbus Avenue, Francisco Street, Powell Street, Bay Street, Pier 33 and the U.S. Pier Head Line in the Bay, and includes the project site. Planning work on the Redevelopment survey area is being conducted jointly by the DCP, the Redevelopment Agency and the Port of San Francisco; a Citizens Advisory Committee has been formed to work with the City agencies. This effort is expected to result in the preparation of an area plan and resulting amendments to the San Francisco Master Plan, amendments to the City Planning Code, and the adoption of a Redevelopment Plan. An Environmental Impact Report would be prepared, and approvals would be necessary from the City Planning Commission, the Redevelopment Commission, the Port Commission, the Board of Supervisors and the Mayor.

2. ZONING

The proposed aquarium structure would reach the maximum allowable height of 40 feet. The building would have a length of approximately 160 feet along The Embarcadero and approximately 196 feet along the service road on the east side. The site is within a 40-X Height and Bulk district where there are no bulk requirements unless the average slope of the site is greater than five percent. The average slope for the proposed project is less than five percent.

For retail space, the City Planning Code requires one parking space for each 500 square feet of occupied floor area up to 20,000 where the occupied floor area exceeds 5,000 square feet, plus one for each 250 square feet of occupied floor area in excess of 20,000. For restaurants, the City Planning Code requires one parking space for each 200 square feet of occupied floor area, where the occupied floor area exceeds 5,000 square feet. For theatre space, the Code requires one space for each eight seats.

The Code makes exceptions to this requirement when the project is located in certain districts. Because this proposed project is in the Northern Waterfront Special Use District No. 1, the City Planning Commission may determine an appropriate reduction in the off-street parking requirement as provided by Section 161(f) of the City Planning Code. In deciding the number of parking spaces that would be appropriate for a specific

project the City Planning Commission will consider: anticipated parking demand, accessibility to the proposed site from freeway ramps and major thoroughfares, minimization of possible conflicts between vehicular traffic and pedestrians, service patterns (other than automobiles), the pattern of land use and parking availability in the area, policies in the Plan for the Northern Waterfront, and other criteria considered applicable.

The project would not include the construction of new parking spaces. Daily parking would be available for visitors at the Pier 39 garage. Signage directing parking traffic from queueing lines along the Embarcadero would be added, directing cars to the AMPCO garage at 80 Francisco, which would provide 400 stalls to be open to the public on weekends. The adequacy of parking facilities included in this project will be considered by the City Planning Commission when it considers the proposed amendment of Pier 39's Conditional Use authorization, and is discussed in the Transportation Impacts section of this EIR.

3. BAY FILL

The proposed aquarium would result in new Bay fill as defined by BCDC. It would involve the construction of an approximately 19,400 square foot extension of the existing pier deck into the area currently occupied by the marina. About 11,800 square feet of this space would be covered by the proposed aquarium building. About 7,600 square feet would be a perimeter access road and pedestrian walkway. About 16 boat slips would be removed. The new pier area would be supported by approximately 114 new piles. This Bay fill could result in Water Quality/Biology impacts (see Water Quality/Biology impacts section of this EIR). Any new Bay fill must be considered by the Bay Conservation and Development Commission, using standards contained in the San Francisco Bay Plan and the San Francisco Waterfront Special Area Plan No. 1 (see the Land Use and Zoning Setting section of this EIR). BCDC may require mitigation of this impact pursuant to its responsibilities under the McAteer-Petris Act.

B. URBAN DESIGN AND VISUAL QUALITY

The proposed project would result in the removal of a structure attached to the southeast portion of the octagonal building at the entry to Pier 39, and the construction of building spaces housing the aquarium, ticketing lobby, offices, foyer and other interior spaces necessary to operate the facility (see Section II, page 10, Project Description). The existing platform and walkway above the water on the east side of the octagon building would also be enlarged to accommodate the project and pedestrian and vehicle passageways.

The building would have two stories and would rise to 40 feet above the street. An elevator penthouse tower, located near the southeast corner of the building, would rise to a height of 50 feet above the street, 10 feet higher than the rest of the building. The building would be similar in height to other buildings in the Pier 39 complex. The building would have a maximum length of approximately 160 feet along The Embarcadero and approximately 230 feet along the service road in the marina.

The design includes numerous setbacks and sloped roofs. On the eastern side is a continuous pedestrian and vehicular roadway. Building material would include glass block, wood siding, sloped dark colored painted metal roofs and board form concrete. Other structures on Pier 39 are wood. There is an extensive use of windows on the first floor south elevation (facing The Embarcadero) and second floor of the east elevation (facing the Marina).

The proposed project could be seen from Telegraph Hill and would be most noticeable from vantage points along The Embarcadero to the southeast. The additional construction would not be seen from the pedestrian corridor of Pier 39 as it would be blocked by existing structures. Refer to Figures 22 to 28, pages 79 to 85, for photomontage views from various perspectives.

The proposed structure would be visible from the pedestrian overpass leading to the Pier 39 Garage (Figure 22, page 79). The structure would appear to be lower in height and of less mass than the adjacent octagonal building. The structure would obstruct views to boats in the marina and the Bay by extending the mass of the Pier 39 complex along The Embarcadero. The views of boats currently enhance the maritime setting.

PHOTOMONTAGE: VIEW LOOKING NORTHEAST FROM BRIDGE TO PIER 39 GARAGE

FIGURE 22

SOURCE: SQUARE ONE VIDEO

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PHOTOMONTAGE: VIEW LOOKING NORTHWEST ALONG THE EMBARCADERO WALKWAY

FIGURE 23

SOURCE: SQUARE ONE VIDEO

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PHOTOMONTAGE: VIEW LOOKING NORTHWEST ALONG THE WATERFRONT PROMENADE

FIGURE 24

SOURCE: SQUARE ONE VIDEO

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PHOTOMONTAGE: VIEW LOOKING NORTHEAST ALONG BEACH STREET

FIGURE 25

SOURCE: SQUARE ONE VIDEO

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PHOTOMONTAGE: VIEW LOOKING NORTH WHERE BEACH STREET MEETS THE EMBARCADERO

FIGURE 26

SOURCE: SQUARE ONE VIDEO

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PHOTOMONTAGE: VIEW LOOKING NORTHWEST AT GRANT AVENUE AND THE EMBARCADERO

FIGURE 27

SOURCE: SQUARE ONE VIDEO

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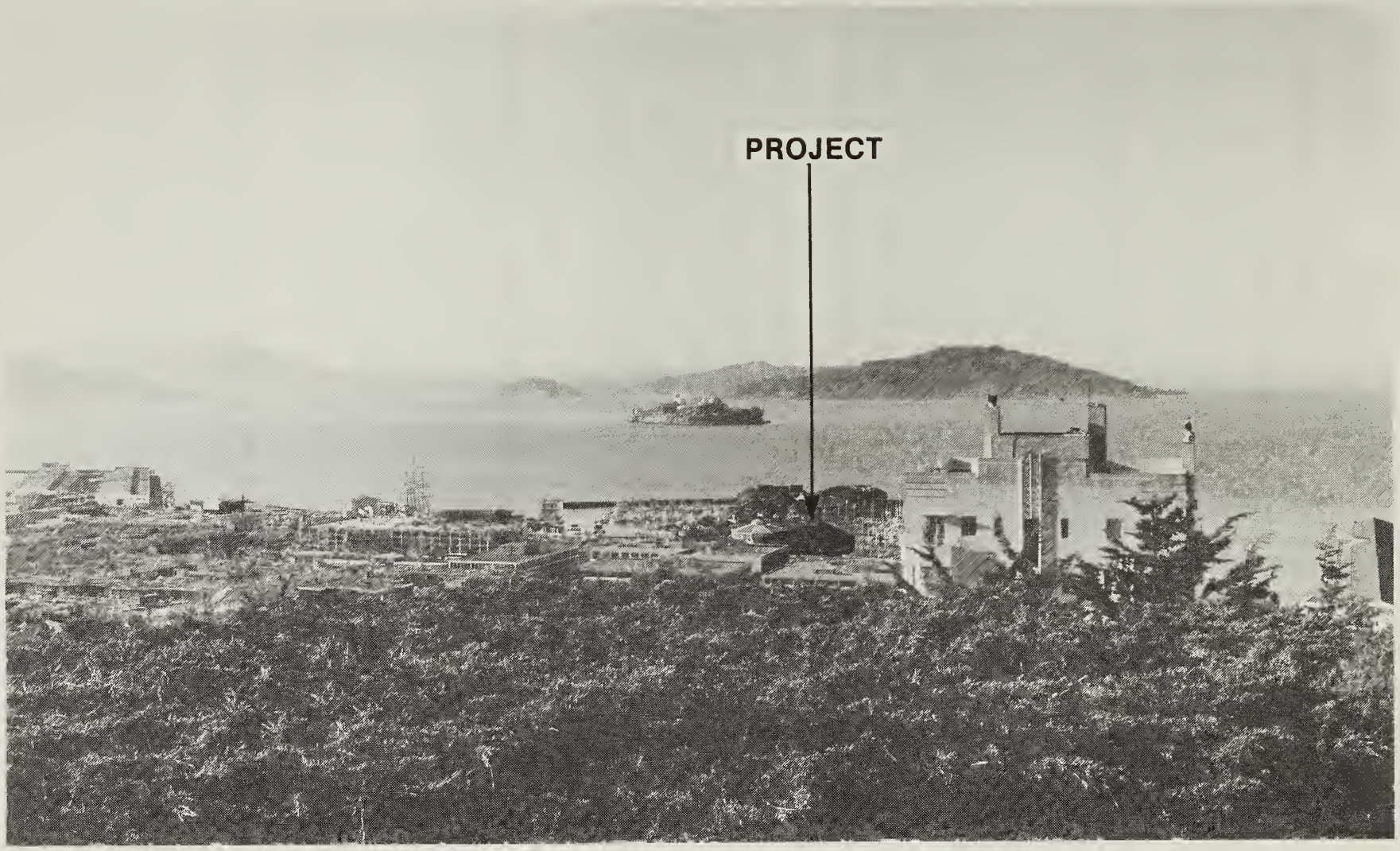
PHOTOMONTAGE: VIEW FROM TELEGRAPH HILL

FIGURE 28



SOURCE: SQUARE ONE VIDEO

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From the east, the project, when viewed from The Embarcadero walkway, would block views to other buildings on the east side of Pier 39 (Figures 23 and 24, pages 80 and 81). Portions of the project would be screened from view by the trees and shrubs along The Embarcadero walkway.

The south portion of the proposed project, the main pedestrian entry, would be visible by pedestrians and motorists on The Embarcadero and Beach Street (Figure 25, page 82). Depending on observer location, the project would block views to boats, boat masts and rigging in the adjacent marina. The overall size and extent of the project would become more evident when viewed from directly south of the project, at the intersection of Beach Street and The Embarcadero (Figure 26, page 83). The various structural components of the project would continue to block views to boats in the marina. There would be greater building frontage along The Embarcadero, with an increasing sense of building enclosure, obstructing public views to the Bay north of Pier 39.

The full extent of the project would be discernable from locations southeast of the project (Figure 27, page 84), near the intersection of Grant Avenue and The Embarcadero, where shrubs and trees of the Northern Waterfront Park would not obstruct views to the project. The project would obstruct public views to the marina and Bay and portions of Angel Island north of Pier 39.

The project would also be viewed from Telegraph Hill (Figure 28, page 85), but would not obstruct views of the Bay from the Hill. Generally, the project would be seen to blend in with the overall complex of structures comprising Pier 39 when viewed from Telegraph Hill.

C. TRANSPORTATION

INTRODUCTION

The following analysis of project impacts is based on the "Underwater World at Pier 39 - Traffic and Transportation Study" (1988) prepared for the City and County of San Francisco by DKS Associates, and is available in the project file at the Department of City Planning, 450 McAllister. Project attendance and trip generation estimates were developed as part of this study following research of attendance trends in the Northern Waterfront and of potential markets and attendance at similar aquariums located at Marine World/Africa USA (Vallejo), Monterey Bay Aquarium (Monterey), Kelly Tarlton's Underwater World (Auckland, New Zealand), Marine Land (Los Angeles), Sea World (San Diego), Sea World (Orlando), Sea World (Ohio), Vancouver Aquarium (Vancouver, B.C.) and Sea Life Park (Honolulu).

Attendance trends at these sites indicated that high-attraction marine aquariums usually generate their highest attendance during the first year of operation due to their unique and unusual entertainment features. Following the peak initial year, attendance slowly drops off, stabilizing after three to five years. For this reason, project impacts were assessed both for the initial year of peak attendance and for a horizon year 15-20 years later, when attendance demand would be stabilized at a lower level, with the proportion of attendance from San Francisco and Bay Area residents declining in comparison to the proportion of attendance from tourists to San Francisco. Both the initial year and horizon year analysis indicated that attendance demand would be in excess of the facility's capacity, which would be a maximum of 900 hourly visitors. Therefore, all transportation analysis is based on this maximum hourly capacity of 900 visitors. In the cumulative section of the EIR "horizon year," "cumulative year," and "long-range year" all refer to this future analysis period 15-20 years from the present.

The analysis presented in this document draws on a number of previous studies carried out in the Northern Waterfront.[1] Traffic counts taken during the spring of 1986 and summer of 1987 were used as the basis for analysis. Counts at the study area intersections on Bay, North Point and Kearny Streets were taken in July and August, 1987 during the peak summer tourist season. The other four intersections were counted in March 1986, when

many local schools and colleges were on spring vacation. Summer 1987 counts taken throughout the Northern Waterfront for the traffic analysis of the Super 8 and Clarion Hotels indicate that in general weekday traffic flows are slightly higher during peak summer periods as compared to peak spring periods.[2] These differences are most noticeable along the periphery of the Northern Waterfront (Bay Street, The Embarcadero, and North Point Street), where summer counts are used in this study. Intersections closer to the waterfront showed no appreciable difference between peak spring and summer conditions on weekends or weekdays.

Analysis of cumulative traffic impacts in the project vicinity was done at two levels. The first was intended primarily to assess the impact of the project on cumulative traffic flows. The second, which included the proposed project, focused on analysis of the potential configurations for a second Pier 39 garage access. Two potential alignments of the planned MUNI F-Market line were included in the analysis of garage access options, the first a double-track alignment along The Embarcadero. The F-line would help relieve the excess cable car demand and would provide accessibility to remote parking areas for visitors to the Northern Waterfront.

SITE SPECIFIC IMPACTS

Trip Generation

All site specific impacts are based on a maximum design capacity of 900 hourly visitors, which is based on the physical capacity of the aquarium facilities.[3] Without admission controls (timed tickets or other forms of constraining the total demand to match the maximum capacity of the facility), attendance could be as high as 12,500 weekday visitors and 28,000 visitors on peak weekend days in the initial year or 10,100 peak weekday and 23,000 peak weekend visitors in the horizon year.[4] The projected attendance demand could exceed capacity on weekends during the initial year and in future years after attendance stabilizes. Undesirable transportation impacts would occur without time-specific admission tickets or a similar method of admission control to limit the maximum hourly attendance to 900 visitors. Controls on admissions could be eased or eliminated if in future years daily attendance falls below the maximum design capacity of the facility.

With attendance limited to the maximum hourly design capacity of 900 visitors, the proposed Underwater World would generate approximately 2,720 person trips (two-way) during the weekend PM peak hour in both the initial year and future years (see Table 7, page 90). During the weekday PM peak hour, the project would generate an estimated 2,350 two-way person trips in the initial year, and 1,900 person trips in future years. Analysis of tourism trends in the Northern Waterfront[5] indicated that approximately 31% of the initial year attendance would be new trips (840 trips on weekends and 730 trips on weekdays). In the long-range analysis year, the proportion of local trips would decrease relative to tourist trips, such that about 29% of project trips would be new trips made specifically to Underwater World (790 weekend trips and 550 weekday trips).

Traffic impacts of the proposed project were evaluated for the PM peak hours of activity on the surrounding street system, when the highest traffic levels of the day are experienced.[6] The project itself would generally generate its peak traffic during the street system afternoon peak period.

Trip Distribution and Mode Split

Private automobiles and public transit would represent the dominant modes of transportation to the project vicinity.[7]

In the initial year, the demand for cable car trips (approximately 18% of project visitor trips) would not be met, as the cable cars currently operate at capacity. Thus, to measure the greatest impact on traffic for the initial year of operation, the cable car demand was redistributed among the remaining transportation modes. By the horizon year, the planned extension of the historic MUNI F-Market line into the Northern Waterfront is assumed to be in operation, and would provide a tourist-oriented transit alternative similar to cable cars. Therefore, the horizon year mode split assigns cable car trips to the F-Market line and the remaining modes are reduced proportionately. The MUNI F-Market line would not have noticeable effects on traffic flow or intersection capacity at intersections, except at Embarcadero/North Point in the case of a single-track configuration. However, it would affect the potential lane configurations in the vicinity of the Pier 39 garage with the addition of a second garage access. Therefore, the F-line

TABLE 7

PROJECT PERSON TRIP GENERATION[1]

	Daily Trips (Two Way)	PM Peak Period[2] In/Out[4]	PM Peak Period[2] Total	PM Peak Hour[3] In/Out	PM Peak Hour[3] Total
Initial Weekend[4]					
Net New[5]	7,810	760/760	1,520	420/420	840
Linked[6]	17,390	1,690/1,690	3,380	940/940	1,880
Total	25,200	2,450/2,450	4,900	1,360/1,360	2,720
Initial Weekday					
Net New	7,750	430/880	1,310	240/490	730
Linked	17,250	950/1,960	2,910	530/1,090	1,620
Total	25,000	1,380/2,840	4,220	770/1,580	2,350
Future Weekend					
Net New	7,310	710/710	1,420	395/395	790
Linked	17,890	1,740/1,740	3,480	965/965	1,930
Total	25,200	2,450/2,450	4,900	1,360/1,360	2,720
Future Weekday					
Net New	5,860	320/670	990	180/370	550
Linked	14,340	810/1,620	2,430	450/900	1,350
Total	20,200	1,130/2,290	3,420	630/1,270	1,900

[1] Limited by maximum design capacity of 900 hourly visitors, based on a 14-hour operation (10:00 AM to midnight).

[2] 4:00 – 6:00 PM on weekdays, 3:00 – 5:00 PM on weekends.

[3] 5:00 - 6:00 PM on weekdays, 3:00 - 4:00 PM on weekends.

[4] City and County of San Francisco, Underwater World at Pier 39: Traffic and Transportation Study, (1988), by DKS Associates.

[5] New trips to Fisherman's Wharf area specifically to see Underwater World.

[6] Trips to Underwater World which would be made to the Northern Waterfront whether or not the project existed.

Source: DKS Associates.

was analyzed in the comparison of garage alternatives based on cumulative traffic, but not in the initial cumulative traffic analysis, which incorporates the existing street system.

In the initial year, about 63% of project visitors would use a private vehicle, 14% would walk or ride a bike, 15% would use public transportation, 3% would use taxis or limousines, and the remaining 5% would use tour buses or vans.

The F-Line would accommodate the project's demand for cable car trips by the long-range horizon year. In the long-range year private vehicle use would decrease to about 52% of project visitor trips. Public transit would handle approximately 30% of project visitors, while 2% would use taxis or limousines, 4% would use tour buses or vans, and 12% would arrive on foot or by bicycle.

The initial and horizon year mode split information for the proposed Underwater World is summarized in Table 8, page 92.

Traffic

Existing Traffic. Existing Levels of service (LOS) and volume-to-capacity ratios (V/C ratios) were computed for eight Northern Waterfront intersections in the weekday and weekend PM peak hours.[8] The intersections include Embarcadero/Bay, Embarcadero/North Point, Embarcadero/Beach, Embarcadero/Powell/Jefferson, Powell/Beach, Stockton/Beach, Kearny/Bay, and Kearny/Francisco. All study area intersections operate at LOS "A," "B," or "C" during the weekday PM peak hour (5:00 PM - 6:00 PM).

On weekends, three intersections operate at LOS "D" or worse during the PM peak hour (3:00 - 4:00 PM): Powell/Beach (LOS "E"), Powell/Jefferson/The Embarcadero (LOS "E"), and Embarcadero/Beach. At Embarcadero/Beach, the small volume of left turn traffic from eastbound Beach onto The Embarcadero operates at LOS "F," while the remaining intersection approaches operate at LOS "A."

TABLE 8

NET NEW PROJECT PERSON TRIPS BY MODE

Modes	Percent[1]	Weekday PM Peak Hour Out	Weekday PM Peak Hour Total	Weekday PM Peak Period Out	Weekday PM Peak Period Total	Weekend Afternoon Peak Hour Out	Weekend Afternoon Peak Hour Total	Weekend Afternoon Peak Period Out	Weekend Afternoon Peak Period Total
Initial Year[2]									
Auto Driver	20%	50/100	150	90/180	270	85/85	170	152/153	305
Auto Passenger	42%	100/205	305	180/370	550	175/175	350	315/315	630
Motorcycle	1%	2/3	5	3/7	10	5/5	10	10/10	20
Taxi/Limousine	3%	7/13	20	10/25	35	12/13	25	23/22	45
MUNI Bus	11%	25/55	80	50/95	145	48/47	95	85/85	170
Cable Car	0%	0/0	0	0/0	0	0/0	0	0/0	0
Other Transit	4%	10/20	30	20/35	55	17/18	35	32/33	65
Tour Bus/Van	5%	15/25	40	25/45	70	20/20	40	35/35	70
Walk	13%	30/65	95	55/115	170	55/55	110	100/100	200
Bicycle	1%	2/3	5	3/7	10	3/2	5	5/5	10
Total	100%	241/489	730	436/879	1,315	420/420	840	757/758	1,515
Horizon Year									
Auto Driver	16%	30/60	90	50/110	160	65/65	130	117/118	235
Auto Passenger	35%	60/130	190	110/230	340	137/138	275	248/247	495
Motorcycle	1%	2/3	5	3/7	10	5/5	10	10/10	20
Taxi/Limousine	2%	3/7	10	5/15	20	8/7	15	12/13	25
MUNI Bus	9%	15/35	50	30/60	90	35/35	70	63/62	125
F-Line	18%	35/65	100	60/120	180	70/70	140	125/125	250
Other Transit	3%	5/15	20	10/25	35	12/13	25	22/23	45
Tour Bus/Van	4%	5/15	20	10/25	35	15/15	30	28/27	55
Walk	11%	20/40	60	35/75	110	45/45	90	80/80	160
Bicycle	1%	2/3	5	3/7	10	3/2	5	5/5	10
Total	100%	177/373	550	316/674	990	395/395	790	710/710	1,420

[1] Assumes cable cars handle no project trips in initial year. In horizon year, F-Market line is assumed to accommodate cable car demand.

[2] Based on retail customer surveys in the "Northern Waterfront Traffic and Transportation Study – Final Consultant's Report," City and County of San Francisco, Department of City Planning, by DKS Associates, March 1987, pages A-14 to A-27. Tour bus/van percent increased for aquarium compared to retail based on Monterey Bay Aquarium mode split data.

Source: DKS Associates.

There is localized congestion along Beach Street and The Embarcadero on weekends during the tourist season. Congestion on The Embarcadero results from long queues of vehicles waiting to enter the Pier 39 garage, heavy pedestrian traffic at the Powell/Jefferson/Embarcadero intersection, and the unusual geometries of this intersection. Heavy traffic leaving the Western Wharf area trying to reach The Embarcadero is the primary cause of weekend afternoon congestion along Beach Street. This heavy traffic flow causes substantial delays at the Powell/Beach intersection. The capacity of Beach Street is significantly reduced by the storage of MUNI buses on the southern curb of the street between Powell and Stockton Streets.

Figure 29, page 109, shows existing weekday intersection performance and Figure 30, page 110, shows existing weekend intersection performance.

Local Traffic Impacts. On weekends in the initial year, the proposed Underwater World would generate about 1,560 net new daily vehicle trips (both directions) and about 1,550 new vehicle trips on weekdays. During the initial year weekday PM peak period, about 300 new vehicle trips would be generated by the proposed project, including approximately 150 which would occur in the PM peak hour. On weekends during the initial year, the proposed project would expect to generate about 320 net new vehicle trips during the PM peak period, with about 170 occurring during the PM peak hour.

Based on the analysis of attendance demand, weekend project attendance demand in the horizon year would also exceed capacity, and therefore would need to be limited to the maximum hourly capacity of 900 visitors. The horizon year analysis assumes that the number of vehicle trips would be less, however, due to fewer new trips made by the resident population, a higher proportion of diverted visitor trips, and the operation of the planned MUNI F-Line extension, which would accommodate the project's cable car demand. In the long-range year, the project would generate approximately 940 daily net new vehicle trips on weekdays (both directions), with about 160 occurring during the PM peak period, and 90 during the PM peak hour. On weekends in the horizon year, the project would generate an estimated 1,170 net new vehicle trips. Approximately 235 new vehicle trips would be expected during the weekend PM peak period, with about 130 during the PM peak hour. Projected net new vehicle trips generated by the proposed project are summarized in Table 9, page 94.

TABLE 9

PROJECT VEHICLE-TRIP GENERATION (NEW TRIPS)[1]

	Daily Vehicle Trips	PM Peak Period[2]		PM Peak Hour[3]	
		In/Out	Total	In/Out	Total
Initial Year[4]					
Weekday	1,550	90/180	270	50/100	150
Weekend	1,560	150/150	300	85/85	170
Horizon Year[5]					
Weekday	940	55/110	165	30/60	90
Weekend	1,170	115/115	130	65/65	130

[1] Net new vehicle trips only, i.e., those attracted to the Northern Waterfront specifically to visit the proposed project. Based on maximum hourly capacity of 900 visitors over a 14-hour day.

[2] 4:00 - 6:00 PM on weekdays, 3:00 - 5:00 PM on weekends.

[3] 5:00 - 6:00 PM on weekdays, 3:00 - 4:00 PM on weekends.

[4] Assumes no net new trips can be accommodated by cable cars. Cable car demand distributed among remaining travel modes.

[5] Assumes MUNI F Line is operational and accommodates cable car demand.

Source: DKS Associates.

Traffic conditions were studied under a scenario where project traffic was added to existing traffic. Of the eight study area intersections, six would experience no change in volume-to-capacity ratios (V/C ratios) or levels of service (LOS). Project traffic would generate a decrease in the level of service from LOS "C" to LOS "D" at the Powell/Beach intersection during the week, and a change from LOS "A" to LOS "B" at Kearny/Bay on weekends, when project traffic would use remote parking accessible via Kearny Street. Increases of approximately one percent would occur at Embarcadero/North Point and Embarcadero/Bay on weekdays and weekends. These increases would fall within the range of normal day-to-day fluctuations in PM peak hour traffic.

Table 10, page 96, summarizes weekday and weekend PM peak hour levels of service and V/C ratios for existing traffic, existing plus project traffic, and traffic from cumulative development, which includes the project.

Regional Traffic Impacts

The proposed Underwater World project would generate about 50 new PM peak-hour and about 85 new PM peak-period outbound regional vehicle-trips on weekdays in the initial year. In the long-range year, the project would generate approximately 40 PM peak hour and 70 PM peak period outbound regional vehicle trips on weekdays. Approximately 60% of the project's peak period regional trips (50 trips in the initial year) would be to the East Bay via the Bay Bridge. U.S.-101 and Interstate 280 together would handle about 30% of the regional trips (about 30 during the PM peak period), while the remaining 10% (10 trips) would use the Golden Gate Bridge to the North Bay. The project travel demand would represent less than 0.5% (one-half of one percent) of the total weekday PM peak period outbound regional auto demand in the year 2000.

Transit

Based on the mode splits developed for the Northern Waterfront Study and summarized in Table 8, page 92, about 15% of all project trips (both new trips and linked trips) would be on public transit on weekdays and on weekends in the project's initial year. By the horizon year, the assumed operation of the MUNI F-Line would increase the transit share of project trips to about 30% by accommodating the demand for cable cars, which would not be met in the project's initial year.

TABLE 10

EXISTING AND PROJECTED INTERSECTION PERFORMANCE

Intersection	Existing[1] V/C LOS	Existing + Project V/C LOS	Cumulative Development With Project (No Mitigation) V/C LOS
Weekday PM Peak Hour[2]			
Signalized			
Embarcadero/Jefferson/Powell	0.72 (C)	0.72 (C)	0.98 (E)
Embarcadero/North Point[4]	0.75 (C)	0.76 (C)	0.77 (C)
Embarcadero/Bay	0.76 (C)	0.77 (C)	0.90 (E)
Kearny/Bay	0.74 (C)	0.74 (C)	0.79 (C)
Unsignalized[5]			
Powell/Beach	C	D	E
Stockton/Beach	A/A	A/A	A/B
Embarcadero/Beach	A/C	A/C	A/E
Kearny/Francisco	A/A	A/A	A/A
Weekend PM Peak Hour[3]			
Signalized			
Embarcadero/Jefferson/Powell	0.93 (E)	0.93 (E)	1.07 (F)
Embarcadero/North Point[4]	0.78 (C)	0.79 (C)	0.83 (D)
Embarcadero/Bay	0.74 (C)	0.77 (C)	0.90 (E)
Kearny/Bay	0.56 (A)	0.60 (B)	0.63 (B)
Unsignalized[4]			
Powell/Beach	E	E	F
Stockton/Beach	A/C	A/C	A/E
Embarcadero/Beach	A/F	A/F	B/F
Kearny/Francisco	A/A	A/A	A/A

[1] Counts conducted by DKS Associates, 1986 and 1987.

[2] 5:00 - 6:00 PM.

[3] Assumes signalization, which is warranted with existing traffic.

[4] Shows levels of service for major approach/minor approach except at Powell/Beach, which is a 3-way stop.

[5] 3:00 - 4:00 PM.

Source: DKS Associates.

Existing transit ridership information indicates that with the exception of the cable cars, transit service within the Wharf is generally underutilized. However, several of the MUNI routes which have excess capacity near their terminals in the vicinity of the project site operate at or near capacity at other points along their routes. Weekday PM peak period load factors for the eight MUNI lines serving the Wharf average approximately 0.39 passengers per seat. The cable cars on the other hand are very full with a load factor of about 1.77 passengers per seat in the PM peak period.

This analysis assumes that the initial year cable car demand generated by the project would not be met due to waiting times for cable cars which would be unacceptable to project patrons. The additional ridership from the project on the cable car system would result in delay increases of about 10 minutes over the existing 50 to 65 minute wait on weekends. As a result, the cable car demand was distributed among the other transportation alternatives.

The project would generate an estimated 160 bus trips on weekdays and 180 trips on weekends aboard the MUNI bus system during the initial year of project operation and 100 weekday MUNI bus trips and 130 weekend MUNI bus trips for the horizon year of the project, but these bus riders would be dispersed among several lines during the peak period. Of the total peak period transit trips, employees of the proposed project may represent one or two trips on Golden Gate Transit, AC Transit, SamTrans, and BART, not enough to have a measurable impact. In the initial year, a few project visitors would also use these regional transit carriers, but would not have a measurable impact. The projected new peak period and peak hour transit trips that would be generated by the proposed project are summarized in Table 6, page 72, above.

Parking

The proposed Underwater World would supply no on-site parking spaces for project visitors or employees. Department of City Planning Staff has identified the proposed project as a retail use for purposes of calculating required off-street parking.[9] The proposed project's required parking would be evaluated as part of Pier 39. Currently, as estimated by the San Francisco Planning Code, the parking requirement for Pier 39 is 857 spaces. The

proposed project would increase the parking requirement by 74 spaces, for a total of 931.[10] The Pier 39 garage has 937 striped stalls.

The project's weekend and weekday off-street parking demand was computed for both a maximum demand scenario, which assumes that the project would operate at capacity throughout the day, and at normal operating conditions, which assumes that the project's attendance pattern would be similar to the Underwater World in Auckland, New Zealand (see Table 11, page 99). The analysis of potential attendance developed in the background traffic study for the project indicated that the project could operate at capacity on weekends in the initial year and future years. (See Appendix B for parking demand calculations.) The greatest parking demand would occur on weekends of the initial year, when the project would require an estimated 180 (moderate demand) to 330 spaces (maximum demand). The initial year weekday demand would range from 160 spaces to a peak of 290 spaces. In the year 2005, the project would generate a weekend demand of 135 to 245 spaces, and a weekday demand of 120 to 175 spaces.

The project sponsor has reached an agreement with AMPCO parking, which operates the 80 Francisco parking garage, to open the garage on weekends. This would add 400 spaces to the weekend parking supply in the Northern Waterfront, which would exceed the project's peak weekend parking demand. In addition, the project sponsor is planning modifications to the Pier 39 garage, which will increase the parking supply in the garage by 40 spaces (18 spaces through restriping for compact stalls, and 22 spaces through reconfiguring the stall layout). The project sponsor is also considering expanding valet operations in the Pier 39 garage to make use of valet parking on every floor. By instituting a moderate level of valet parking on every floor, it would be possible to increase the number of valet spaces to 220-250 spaces, an increase of 50 to 80 spaces over the current peak level of valet activity. This would require at least one garage attendant per floor to ensure that valet operations would not create excessive processing delays.

During the week, the project would create a maximum parking demand of approximately 290 stalls. Recent surveys by DKS indicate that public off-street parking is less than 70 percent occupied during summer weekday afternoons[11] (see Appendix B for survey details) which would leave ample parking available to accommodate weekday project visitors. The

TABLE 11

PROJECT PARKING DEMAND

	Weekday Demand		Weekend Demand	
	Maximum[1]	Moderate[2]	Maximum	Moderate
Initial Year	290	160	330	180
2005	175	120	245	135

[1] Maximum demand based on capacity operation (900 people/hour) over a 14-hour day.

[2] Moderate demand based on the Auckland, New Zealand Underwater World attendance profile.

Source: DKS Associates.

Pier 39 garage was observed to have over 100 of the 937 striped spaces available during the week. Combined with a moderate level of valet parking during the week and the proposed striping and layout improvements, the Pier 39 garage alone would be able to satisfy the project's maximum weekday demand. On weekends during the tourist season, the Pier 39 garage is completely occupied throughout the day, with the inside northbound lane on The Embarcadero serving as a queue lane for visitors waiting to enter the garage.

Off-Street Loading

The Underwater World project would have a requirement under Section 152 of the City Planning Code for one off-street loading space. The proposed project would provide a freight loading area on the expansion of Pier 39 to the east of the existing pier, which would be accessible from a proposed service vehicle access road leading around the east side of the project from The Embarcadero. The project would generate about 5 to 10 daily truck trips, of which most would be made by smaller delivery vehicles.

Pedestrians

The Underwater World Project site fronts along The Embarcadero, across from the intersection of The Embarcadero/Beach Street. Most project visitors would approach the site along the sidewalks on the east side of The Embarcadero.

The middle sidewalk of the three parallel sidewalks west of the project site was observed to have impeded flow during the Saturday peak period, while the other two sidewalks had open pedestrian flow. West of Pier 39, pedestrian flow was observed to be unimpeded during the weekday and weekend peak periods, and impeded during the weekday noon hour.[12]

Essentially all project visitors would be pedestrians near the project site. The project would generate an estimated 2,720 pedestrian trips during the weekend peak hour of both the initial and future years. On weekdays, about 2,350 initial year and 1,900 horizon year pedestrian trips would be expected.

Of the total PM peak hour pedestrian trips generated by the project, approximately 50% could be expected to approach the project entrance from the west along The Embarcadero. Approximately 40% would be expected to approach from the south. These visitors would arrive from the pedestrian bridge across The Embarcadero/Beach, the signalized pedestrian crossing at Embarcadero/Beach, or the existing passenger loading area in front of the entrance to Pier 39. Another 10% could be expected to approach along the north side of The Embarcadero from the east.

The anticipated increases in pedestrian traffic along these sidewalks would not change any of the existing pedestrian flow service levels during weekday or weekend PM peak hours. Additional pedestrians using the signalized crosswalk at Embarcadero/Beach would not be likely to affect weekend traffic flow in The Embarcadero, since traffic stops frequently to allow pedestrians to cross under existing pedestrian flow conditions. During the week, when pedestrian flow is much lighter, the project pedestrian traffic would be more likely to increase the number of times The Embarcadero/Beach crosswalk is activated and stops traffic on The Embarcadero. However, since existing traffic and pedestrian volumes at the intersection are much lower during the week as compared to weekends, a few additional pedestrian crossings would not be likely to impede traffic flow.

Table 12, page 102, summarizes the existing pedestrian flow conditions and the projected project impact at the sidewalks on either side of the project site.

The heaviest pedestrian flows would occur immediately in front of the main project entrance. The proposed project entrance includes landscaping design which would help to guide pedestrians to the project entrance, while still providing adequate area to accommodate the expected pedestrian volumes.

Tour Bus/Passenger Loading

The main pedestrian entrance to the proposed project would be about 80 feet northeast of the existing Pier 39 passenger loading area. Passenger pick-up and drop-off for taxis, tour buses, limousines and vans would occur at the existing Pier 39 passenger loading area. No additional passenger loading space has been proposed.

Vehicles entering the passenger loading area would circulate as they do today, entering from and exiting onto northbound Embarcadero. Frequently, particularly on weekends during the tourist season, the existing passenger loading area fills up, forcing passenger vehicles to unload passengers on The Embarcadero. When such on-street loading occurs, one through travel lane on northbound Embarcadero is blocked. Combined with the Pier 39 garage queuing which occurs on weekends in the innermost northbound lane, this decreases the capacity of The Embarcadero northbound to a single through lane in the project vicinity. On weekdays, the innermost northbound lane on The Embarcadero is not needed to provide storage for Pier 39 garage traffic, so on-street loading, when it occurs, is less of a problem for traffic flow.

On-street passenger loading could also interfere with the planned MUNI F-Market line. The F-line would run along the northbound curb lane of The Embarcadero. Passenger loading in through lanes along The Embarcadero, as occurs today, could potentially block the F-line tracks.

Based on the project's estimated travel demand and the transportation mode split characteristics, the project would require approximately 200 feet of new passenger loading area to meet the estimated peak demand for taxi, limousine, tour bus, and van loading space. Additional passenger loading areas would be needed to prevent traffic

TABLE 12

EXISTING AND PROJECTED PEDESTRIAN FLOW REGIMES

Sidewalk Location	Weekday			
	Existing		Existing and Project	
	p/f/m[1]	Flow Regime[2]	p/f/m	Flow Regime
Embarcadero west of Pier 39[3]	0.68	Unimpeded	1.11	Unimpeded
Embarcadero east of Pier 39[4]	2.10	Impeded	2.20	Impeded

Sidewalk Location	Weekend			
	Existing		Existing and Project	
	p/f/m	Flow Regime	p/f/m	Flow Regime
Embarcadero west of Pier 39[5]	3.69	Impeded	3.90	Impeded
Embarcadero east of Pier 39[5]	1.23	Unimpeded	1.41	Unimpeded

[1] p/f/m - passengers per foot of effective sidewalk width per minute.

[2] For pedestrian flow regime definitions and descriptions, see Appendix B.

[3] Pedestrian counts conducted by DKS Associates, March 26, 1986.

[4] Pedestrian counts conducted by DKS Associates, March 18, 1987. Flow was observed for noon hour, which is the period of highest pedestrian flow during weekdays.

[5] Pedestrian counts conducted by DKS Associates, August 8, 1987.

Source: DKS Associates.

congestion on The Embarcadero from becoming worse, and to avoid blockage of future trolley tracks caused by on-street passenger loading, with the additional loading demand which the project would generate. Potential locations for additional loading areas are discussed in Chapter V. Mitigation.

Construction Activity

During the construction period, transportation impacts would result from truck movements to and from the site during construction activity. Construction activities (concrete pouring and refinishing, and pier expansion) would generate an average of 10-15 truck movements per day from the site. Deliveries of materials would occur between 9:00 AM and 3:30 PM. The actual duration of construction activity would be approximately 14 months. During the construction period, the sidewalks fronting the project site would be affected, although they would not necessarily be closed. No temporary traffic lane closures would be required. Some lane blockages could occur when construction deliveries are made, however, most of the construction activity is scheduled for the middle of the day on weekdays when traffic conditions are not congested. Lane and sidewalk closures are subject to review and approval by the Department of Public Works.

The impact of construction truck traffic would be a slight lessening of capacities of access streets and haul routes because of the slower movements and larger turning radii of trucks. MUNI runs along Bay, The Embarcadero, and North Point Streets. Lane blockage on these streets by queued trucks, if it were to occur, would reduce the capacity of the street and could interfere with the operation of the MUNI system. Blockage during times of peak traffic flow would have greater potential to create conflicts than during non-peak hours because of the greater peak-hour numbers of vehicles in adjacent lanes and vehicles (autos and buses) that would have to maneuver around the queued trucks.

Temporary parking demand from construction workers' vehicles, and impacts on local intersections from construction work traffic, would occur in proportion to the number of construction workers who use automobiles. This may create a need for 10 to 30 temporary stalls.

The impact of construction truck traffic would be a slight lessening of capacities of access streets and haul routes because of the slower movements and larger turning radii

of trucks. MUNI runs along Bay, The Embarcadero, and North Point Streets. Lane blockage on these streets by queued trucks, if it were to occur, would reduce the capacity of the street and could interfere with the operation of the MUNI system. Blockage during times of peak traffic flow would have greater potential to create conflicts than during non-peak hours because of the greater peak-hour numbers of vehicles in adjacent lanes and vehicles (autos and buses) that would have to maneuver around the queued trucks.

CUMULATIVE IMPACTS

This section identifies transportation impacts of potential future development which was studied as part of the Northern Waterfront Study. The future development scenarios analyzed there have been updated to include cumulative projects proposed since the Northern Waterfront Study which were not on "soft sites," including the proposed project.[13] The following sections discuss future travel demand changes, and the corresponding impact on traffic, transit, pedestrian and parking conditions in the study area. The study area for the cumulative analysis includes the entire Northern Waterfront Study Area in addition to the smaller eight-intersection study area used for the rest of the Underwater World EIR transportation analysis. The list of intersections studied for the cumulative analysis was expanded from the Northern Waterfront Study to include the intersections of Powell/Beach, Stockton/Beach, The Embarcadero/Beach, Kearny/Bay, and Kearny/Francisco. These five intersections would be most affected by passenger car and tour bus traffic to and from the project site, the Pier 39 parking garage, and the 80 Francisco parking garage, which would be used by project visitors on weekends.

The planned extension of the historical F-Market trolley line into the Northern Waterfront has been incorporated into the cumulative traffic analysis. A number of potential track routes and configurations were considered initially. The choices have now been reduced to three. Two would be double-track alignments along The Embarcadero to a turnaround at Taylor Street or Hyde Street. Both double-track alignments would be identical in the project vicinity from Bay Street past Mason Street. The third potential alignment would be a single track configuration which would run north on The Embarcadero to Jefferson Street, westbound on Jefferson to Jones Street, south to Beach Street, and east on Beach Street back to The Embarcadero. Each of the potential F-line configurations would affect potential roadway geometrics along study area roadway segments which would share right-of-way with the F-line.

Cumulative Travel Demand

Travel demand has four basic components: trip generation, mode split, trip distribution, and trip assignment. Specific data for the Northern Waterfront area land uses were developed through a series of surveys of travel characteristics. These data were then applied to identify the amount of net new trips which would be generated in the study area. As part of the Northern Waterfront Traffic and Transportation Study, three land use scenarios have been evaluated, including Scenario A (Hotel/Retail), Scenario B (Office/-Retail), and Scenario C (Housing/Office). Based on trip generation, mode split, and trip distribution data collected within the study area, an assessment of travel was prepared. Scenario A would generate the greatest number of person trips, adding roughly 34,700 daily trips on weekdays and 39,610 trips on weekends. This is due mostly to the emphasis on retail and hotel land uses. During the weekday evening peak hour, Scenario B would generate the greatest number of net new vehicle trips (1,230) but the least number of vehicle trips for the weekend PM peak hour (550), when the overall level of traffic flow is greater. This is due to the emphasis on office land use. For this EIR, two scenarios were used in order to provide the most conservative traffic analysis for both weekdays and weekend days. Scenario A, Hotel and Retail Development, was used to analyze projected long-term development impacts on the Northern Waterfront for the weekend PM peak hour. Scenario B, Office and Retail Development, was used as the most conservative scenario to analyze long-term development impacts during the weekday PM peak hour. (Although Scenario A would generate more total new person trips during the weekday PM peak hour, due to office trip distribution patterns Scenario B would generate more net new vehicle trips and would result in six intersections with level of service "D" or worse as opposed to three with Scenario A.) A complete discussion of the surveys and summaries of trip generation, mode split, trip distribution and trip assignment for all three scenarios is in the Northern Waterfront Traffic and Transportation Study.[14]

Cumulative Trip Generation and Trip Distribution

Vehicle trip generation was estimated based on surveys of comparable land uses in the Northern Waterfront. The Hotel/Retail scenario would generate about 1,030 net new vehicle trips in the weekend PM peak hour. The Office/Retail Scenario would generate approximately 1,230 net new vehicle trips in the weekday PM peak hour. The auto driver

trip distribution was derived by eliminating person trips by non-auto modes such as transit or walking and recalculating the trip distribution. Vehicle trips to and from the proposed developments were assigned to the existing street network within the study area based on a combination of the derived auto driver trip distribution, the existing vehicle travel patterns, and the trip assignment information collected by DKS Associates as part of the pedestrian interviews conducted at the Wharf during 1985 and 1986. The weekday office trip assignment information was collected by DKS Associates at offices in the Northern Waterfront during 1985 and 1986.[15] Primary vehicle access routes to/from the Wharf are The Embarcadero, and to a lesser extent, Bay/Franklin Street, and Van Ness and Columbus Avenues. Table 13, page 107, shows the number of net new person trips for a typical weekday and weekend day, the mode split for those person trips, trip distribution and the number of vehicle trips for cumulative land uses under the Hotel/Retail scenario for weekends and the Office/Retail scenario for weekdays.

Future traffic volumes were computed by establishing specific traffic loadings of new land use scenarios in the Northern Waterfront area, growth in background traffic, and growth of through travel. Traffic from each land use scenario was estimated and assigned to the roadway network based on the trip generation, mode split, trip distribution, and trip assignment process. Growth in background traffic has been estimated based on historical trends of tourist activity in San Francisco. To account for expected growth in background traffic to the horizon year, existing traffic volumes within the Wharf have been increased by 14% for streets such as the north/south streets and Jefferson and Beach Streets.[16] Through traffic along Bay Street was increased by 6.1%. Through traffic on Bay Street was determined for the PM peak hour based on traffic count data collected for the Northern Waterfront Traffic and Transportation Study.

Existing Traffic Conditions

There are three factors which appear to have direct influence on congestion at the Northern Waterfront: parking, pedestrians and through traffic. Throughout the Northern Waterfront, traffic backs up near the parking garages due to the garage becoming full and traffic waiting to get in. This is particularly critical at the Pier 39 garage and affects traffic in a two-block vicinity of the garage on weekends, but generally only Powell Street on weekdays. Pedestrian concentrations affect traffic operation along Jefferson Street,

TABLE 13

POTENTIAL CUMULATIVE DEVELOPMENT
IN THE NORTHERN WATERFRONT AREA
(Trip Characteristics)

	Weekday[1]	Weekend[2]
TRIP GENERATION - Net New Person Trips		
Daily	28,610	39,610
PM Peak Hour	3,440	3,540
MODE SPLIT - New Person Trips in PM Peak Hour		
Auto	2,060	1,930
Transit	820	660
Walk	480	820
Other	80	130
Total	3,440	3,540
TRIP DISTRIBUTION - New Person Trips in PM Peak Hour		
Area		
SF (NE)	1,070	1,890
SF (NW)	400	150
SF (SE)	250	150
SF (SW)	330	170
East Bay	710	560
Peninsula	420	470
North Bay	260	150
Total	3,440	3,540
VEHICLE TRIP GENERATION - New Vehicle Trips		
Daily	10,620	9,790
PM Peak Hour	1,260	840

[1] Weekday analysis uses the Office/Retail Scenario "B."

[2] Weekend analysis uses the Hotel/Retail Scenario "A."

Note: Both scenarios include the proposed project and proposed developments at 111 Chestnut Street (residential/retail) and 55 Francisco Street (office).

Source: DKS Associates.

Taylor Street, and at the intersection of Beach and Hyde Streets. Pedestrian/vehicle conflicts reduce intersection capacities at these locations and often result in slow vehicle speeds and delays. Through traffic has its greatest effect on Bay Street, since it serves as a connection from the downtown to western San Francisco and the North Bay. Traffic generally backs up at Columbus Avenue and Bay Street during the PM peak hour.

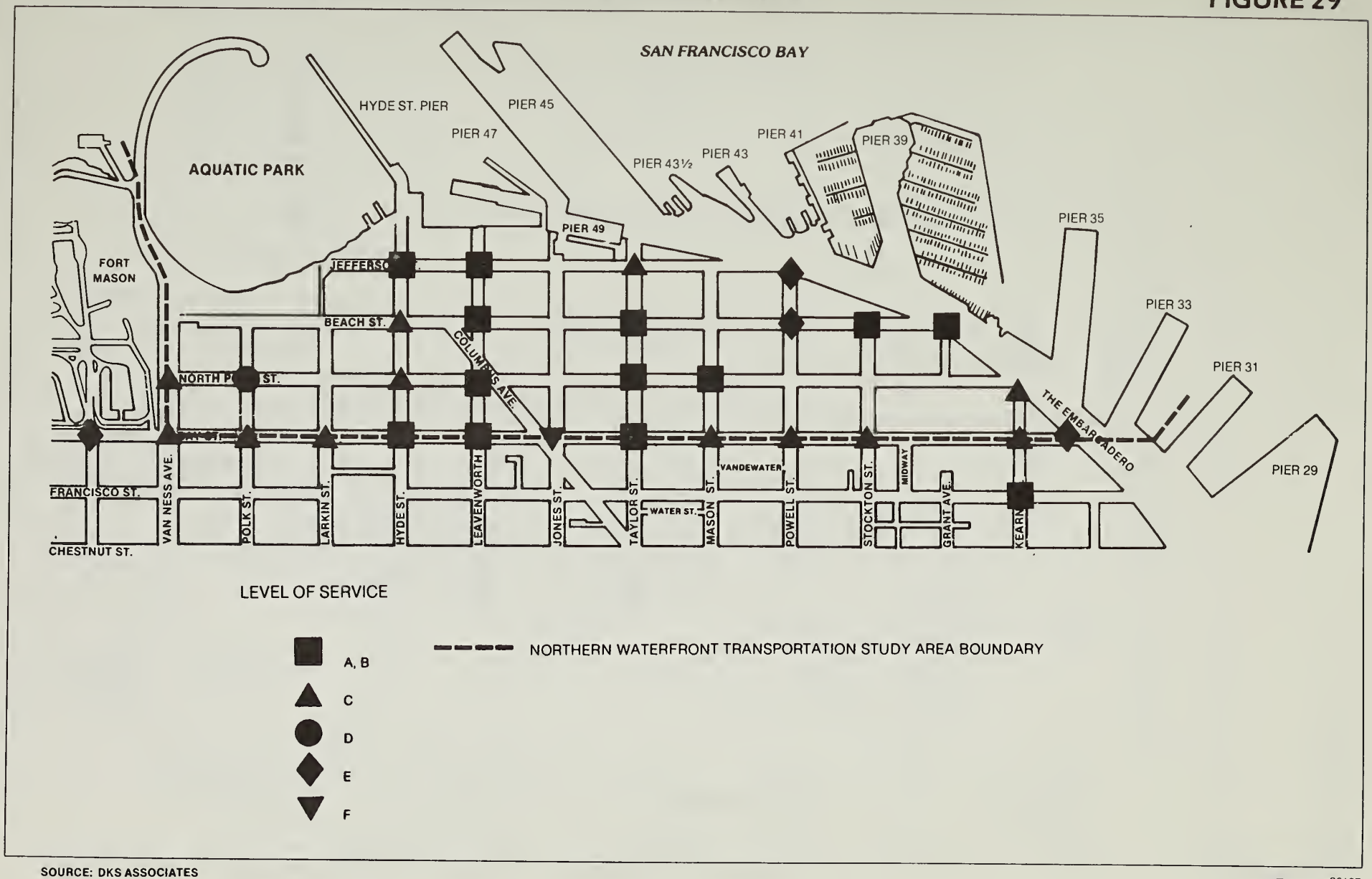
Congestion within the inner Wharf area tends to be localized at garage access points and in areas with heavy pedestrian activity. Level of service and volume-to-capacity ratios were computed for additional Northern Waterfront intersections beyond the vicinity of the Underwater World project site as part of the Northern Waterfront Study[17] and are summarized in Figures 29 and 30, pages 109 and 110, and Table 14, page 111. Several Bay Street intersections and the intersection of Beach/Hyde (on weekends) presently experience serious traffic congestion. Most other area intersections currently operate at LOS "A," "B," or "C" during the PM peak hour both on weekday and weekend days, which represent generally acceptable traffic conditions.

Future Cumulative Traffic Conditions

Upon build-out of the land use scenarios, future traffic operations along Bay Street would become more congested. Figures 29 and 30, pages 109 and 110, present the horizon year levels of service computed for a weekday and a weekend. Table 14, page 111, shows the V/C ratios in addition to the levels of service shown in Figures 29 and 30. With the existing circulation system, LOS "F" condition would occur at the intersection of Columbus/Bay on weekdays, with Franklin/Bay, Powell/Beach, and Embarcadero/Bay operating at LOS "E". More acceptable (LOS "D" or better), traffic conditions would occur on most streets located north of Bay Street.

WEEKDAY HORIZON YEAR INTERSECTION PERFORMANCE

FIGURE 29



SOURCE: DKS ASSOCIATES

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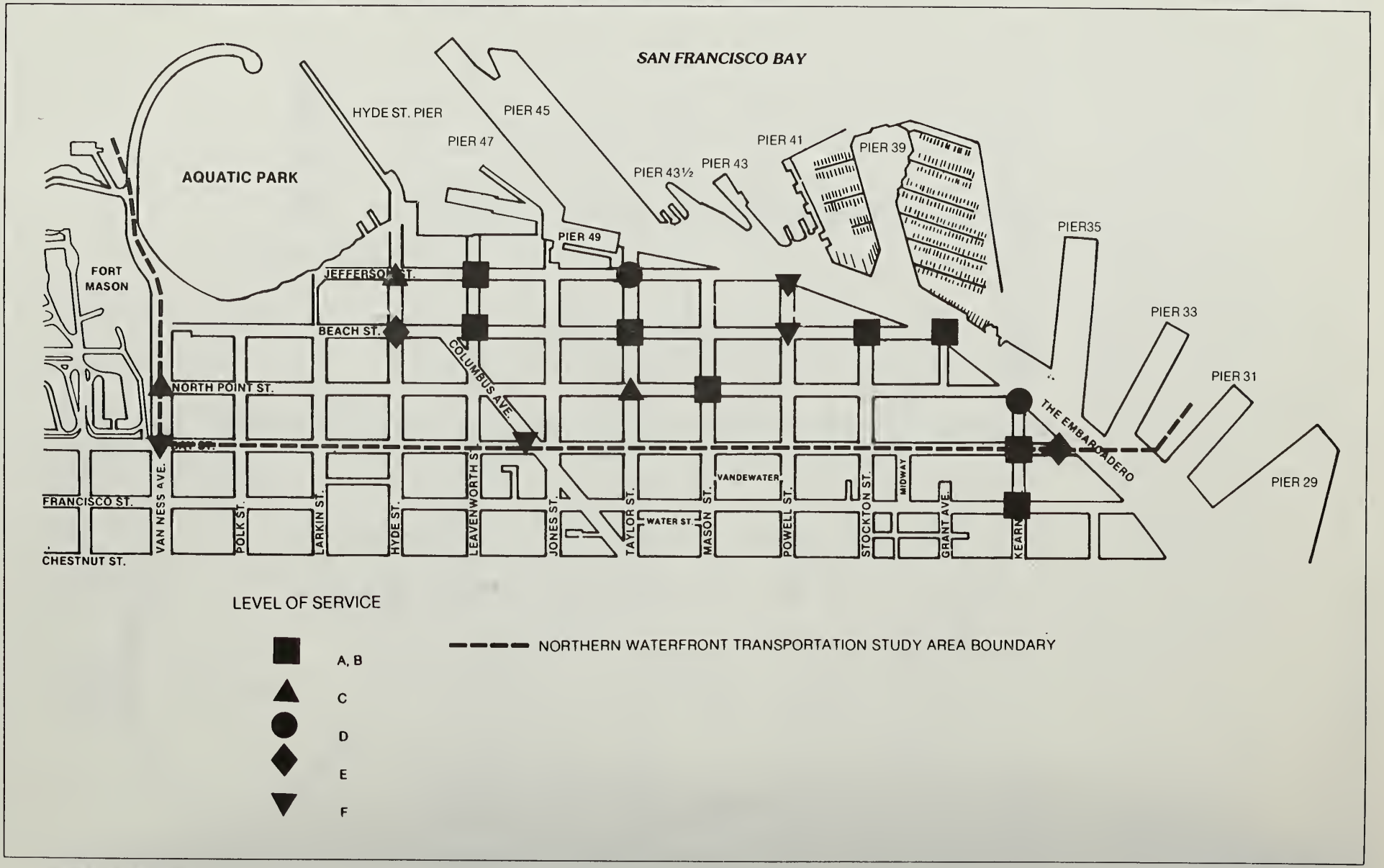
WEEKEND HORIZON YEAR INTERSECTION PERFORMANCE

FIGURE 30



SOURCE: DKS ASSOCIATES

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TABLE 14

EXISTING AND PROJECTED INTERSECTION PERFORMANCE[1]
EXISTING CIRCULATION
(V/C Ratios, LOS)

Intersection	Existing[2]		Cumulative Development Including Project	
Weekday PM Peak Hour[3]				
Hyde/Jefferson	0.50	(A)	0.52	(A)
Leavenworth/Jefferson	0.44	(A)	0.44	(A)
Taylor/Jefferson	0.63	(B)	0.71	(C)
Embarcadero/Powell/Jefferson	0.72	(C)	0.98	(E)
Hyde/Beach	0.60	(A)	0.75	(C)
Leavenworth/Beach	0.42	(A)	0.46	(A)
Taylor/Beach	0.48	(A)	0.57	(A)
Powell/Beach	0.78	(C)	0.96	(E)
Van Ness/North Point	0.70	(B)	0.70	(B)
Polk/North Point	0.63	(B)	0.81	(D)
Hyde/North Point	0.58	(A)	0.74	(C)
Leavenworth/North Point	0.65	(B)	0.67	(B)
Taylor/North Point	0.49	(A)	0.52	(A)
Mason/North Point	0.48	(A)	0.54	(A)
Embarcadero/North Point	0.75	(C)	0.77	(C)
Franklin/Bay	0.85	(D)	0.93	(E)
Van Ness/Bay	0.69	(B)	0.79	(C)
Polk/Bay	0.62	(B)	0.69	(C)
Larkin/Bay	0.63	(B)	0.71	(C)
Hyde/Bay	0.63	(B)	0.68	(B)
Leavenworth/Bay	0.57	(A)	0.62	(B)
Columbus/Bay	0.92	(E)	1.07	(F)
Taylor/Bay	0.50	(A)	0.54	(A)
Mason/Bay	0.67	(B)	0.77	(C)
Powell/Bay	0.65	(B)	0.76	(C)
Stockton/Bay	0.65	(B)	0.77	(C)
Embarcadero/Bay	0.76	(C)	0.90	(D)
Kearny/Bay	0.74	(C)	0.79	(C)
Stockton/Beach[5]	A/A		A/B	
Embarcadero/Beach[5]	A/C		A/E	
Kearny/Francisco[5]	A/A		A/A	

TABLE 14, continued

Intersection	Existing		Cumulative Development Including Project	
Weekend PM Peak Hour[4]				
Hyde/Jefferson	0.68	(B)	0.77	(C)
Leavenworth/Jefferson	0.50	(A)	0.54	(A)
Taylor/Jefferson	0.76	(C)	0.87	(D)
Embarcadero/Powell/Jefferson	0.93	(E)	1.07	(F)
Hyde/Beach	0.84	(D)	0.99	(E)
Leavenworth/Beach	0.43	(A)	0.49	(A)
Taylor/Beach	0.56	(A)	0.64	(B)
Powell/Beach	0.96	(E)	1.17	(F)
Van Ness/North Point	0.70	(B)	0.70	(B)
Taylor/North Point	0.61	(B)	0.71	(C)
Mason/North Point	0.50	(A)	0.59	(A)
Embarcadero/North Point	0.78	(C)	0.83	(D)
Van Ness/Bay	0.95	(E)	1.05	(F)
Columbus/Bay	0.93	(E)	1.07	(F)
Embarcadero/Bay	0.74	(C)	0.90	(D)
Kearny/Bay	0.56	(A)	0.63	(B)
Stockton/Beach[5]	A/C		A/E	
Embarcadero/Beach[5]	A/F		A/F	
Kearny/Francisco[5]	A/A		A/A	

[1]Office/Retail and use scenario used for weekday analysis, and Hotel/Retail scenario for weekend analysis, in order to provide conservative analysis for both periods.

[2]Counts conducted by DKS Associates, 1986 and 1987.

[3]5:00 - 6:00 PM.

[4]3:00 - 4:00 PM. On weekends there would be fewer intersections impacted and those intersections that are impacted would have a decreased level of impact due to the lack of weekday commuter traffic.

[5]Unsignalized intersections. Table shows LOS for major approach/minor approach.

Source: DKS Associates.

Compared to existing weekday conditions, LOS at 16 of the 31 intersections would become worse. Intersections projected to be operating at levels of service "D" or worse are listed below. With existing traffic flows, only two intersections operate at LOS "D", "E", or "F."

Projected Horizon Year Weekday PM Peak Hour Conditions
Existing Circulation Pattern

LOS "D"	LOS "E"	LOS "F"
Polk/North Point	Franklin/Bay	Columbus/Bay
Embarcadero/Bay	Powell/Beach	
	Embarcadero/Powell/Jefferson	

During weekend conditions, LOS at 13 of the 19 weekend study intersections would get worse, with cumulative development generally degrading one level of service. Intersections projected to be operation at "D" or worse levels of service are listed below. Currently there are five intersections operating at LOS "D," "E" or "F."

Projected Horizon Year Weekend PM Peak Hour Conditions
Existing Circulation Pattern

LOS "D"	LOS "E"	LOS "F"
Taylor/Jefferson	Hyde/Beach	Van Ness/Bay
Embarcadero/North Point		Columbus/Bay
Embarcadero/Bay		Powell/Beach
		Embarcadero/Powell/Jefferson

Cumulative Transit Impacts

Existing transit ridership information indicates that with the exception of the cable cars, MUNI transit lines generally have capacity available in the Northern Waterfront, although many lines serving the Northern Waterfront operate at or near capacity at other points along their routes.[18] Weekday PM peak period load factors for the eight MUNI lines serving the Wharf average approximately 0.39 passengers per seat. The cable cars on the other hand are very full, with a load factor of about 1.77 passengers per seat in the weekday PM peak period.

Specific data were collected regarding cable car ridership on weekends. Patrons were observed boarding and alighting from cable cars between 10:00 AM and 6:00 PM at the two terminals located at Beach/Hyde and Bay/Taylor. The peak hourly patronage occurred between 12:00 and 1:00 PM with about 1,760 riders on both lines. Additionally, waiting times to board a cable car at the Beach/Hyde turnaround were surveyed. Between 12:00 noon and 6:00 PM, cable car waits range between 50 and 65 minutes. Wait times observed at the Bay/Taylor turnaround were somewhat less, averaging between 30 and 45 minutes throughout the survey.

Based on the observed waiting times and the relative flatness of the cable car patron count curve, it is apparent that the cable car lines are effectively operating at capacity, at least during the hours from 12:00 to 6:00 PM on weekend days. This leaves little room for ridership growth since substantial additional capacity from additional cars or shorter headways is very unlikely.

Based on the trip generation and mode split data, an estimate has been made of the expected increase in transit travel resulting from the two cumulative development scenarios. Table 15, page 115, summarizes the expected increase in weekday, Saturday, and weekday PM peak period transit ridership. Transit trips from the proposed Underwater World, the approved project at 111 Chestnut Street, and the proposed project at 55 Francisco Street are included.

The total number of additional weekday daily transit trips generated is expected to be about 7,600 riders. On a Saturday, the number of daily transit trips generated is expected to be 6,800. During the weekday PM peak period (4-6 PM), roughly 1,350 transit trips would be generated.

Projected weekday daily MUNI trips generated by cumulative development (3,600) represent a 15% increase in existing ridership. The rough estimates of ridership for the weekday peak period indicate that MUNI bus lines have adequate capacity to serve future demands within the Northern Waterfront, although some crowding would occur during the peak. Many of the lines serving the Northern Waterfront operate at or near capacity

TABLE 15

CUMULATIVE DEVELOPMENT IN NORTHERN WATERFRONT
PROJECTED INCREASE IN TRANSIT TRIPS - YEAR 2000

	Total	Muni	Cable Car	Other Transit
Weekday-Daily	7,580	4,520	2,450	610
Weekend (Saturday)-Daily	6,780	2,330	3,970	480
Weekday-PM Peak Period (4-6)	1,350	640	600	110

Source: DKS Associates, Northern Traffic and Transportation Study, March, 1987; Underwater World Traffic and Transportation Study, July 1988.

Note: Weekday based on office-intensive cumulative land use scenario (Scenario "B"); weekend based on hotel/retail intensive scenario (Scenario "A").

today at other points along their routes. The additional transit ridership from cumulative Northern Waterfront development would increase the number of these other points operating at or near capacity and/or the length of the daily peak ridership periods.

Weekday and weekend daily cable car trips would represent an estimated 6 to 10% increase in existing ridership. Because the cable car lines are currently operating at capacity on most days during the tourist season, it is not expected that the cable car system would be able to accommodate this additional demand without greater delays. Because of this, numbers shown in the Table 15, above, are intended to reflect future cable car demand rather than actual operating conditions. The planned MUNI F-Line extension could accommodate much of the excess cable car demand. The F-Line potentially could attract 10,000 daily patrons, including some 900 riders north of Market Street during the PM peak hour.[19] This would help relieve the overburdened cable car lines while improving transit accessibility to the Northern Waterfront and the project study area.

Cumulative Pedestrian Impacts

Pedestrian flows were counted at several locations in the Northern Waterfront. The pedestrian flow rate was analyzed for peak 15-minute periods on a weekday and weekend afternoon. The pedestrian flow rates reflect the number of pedestrians per foot of effective sidewalk width (unobstructed width) per minute. Cumulative pedestrian flows resulting from development throughout the Northern Waterfront were evaluated to determine their effect on pedestrian conditions.

The flow rates indicate that during weekdays, pedestrian flow is within the impeded flow regime or better. The heaviest existing weekday pedestrian flows occur on Jefferson Street. During weekends, pedestrian flow is heavy along The Embarcadero to Pier 39, along Jefferson Street and along Beach Street near Hyde. Constrained or crowded flow conditions occur at several of the counted locations. With future development, weekday pedestrian flow would degrade at Jefferson and Taylor with three locations experiencing crowded or constrained flow. On weekends with future development, nine locations would experience constrained, crowded or congested flow regimes. In particular, the south side of Jefferson Street near Taylor would become congested, which represents unacceptable pedestrian conditions. Flow conditions along The Embarcadero would be degraded to constrained flow.

The greatest pedestrian problem in the Northern Waterfront area is the lack of clear pedestrian walkways. The street artists, vendors, crab/shrimp sales and arcades nearly eliminate clear walking lanes and result in congestion due to people conducting business. Alternative paths are limited and do not fall within the primary lines of activities. Walk trips are essential to the transportation system in the Northern Waterfront. Many of the shopping trips are linked together by making stops at several stores or other activities.

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[1]Other studies which the Underwater World transportation analysis draws on include:

City and county of San Francisco, Northern Waterfront Traffic and Transportation Study, Final Consultant's Report, by DKS Associates, March 1987. This document is the primary source for the cumulative analysis.

City and County of San Francisco, Final Environmental Impact Report: Super 8 Hotel (85.111E) and Clarion Hotel (85.114E), certified October 22, 1987.

City and County of San Francisco, Underwater World Aquarium at Pier 39, Traffic and Transportation Study, by DKS Associates, May, 1988.

[2]City and County of San Francisco, Final Environmental Impact Report: Super 8 Hotel (85.111E) and Clarion Hotel (85.114E), certified October 22, 1987.

[3]Based on information provided by Clive Jones, Economics Research Associates (ERA), February 26, 1988. The people mover underneath the aquarium would be 400 feet long by six feet wide, a total of 2,400 square feet. It could accommodate approximately 350-400 people at any one time, assuming 6-7 square feet per person. The people mover would make two revolutions per hour, for an hourly capacity of 700-800 per hour. A maximum of 900 per hour was used as a conservative figure for the analysis, which accounts for project patrons in the gift shop and above-tank viewing areas. With visitors admitted from 10:00 AM to 12 midnight, the hours of operation of Pier 39 restaurants, the maximum daily capacity of the project would be 12,600 (14 * 900). This maximum capacity-controlled level of attendance could be exceeded in the initial year without attendance controls, based on the analysis of potential project penetration into tourist and resident markets described in the background study to this EIR ("Underwater World at Pier 39 - Traffic and Transportation Study," 1988, prepared for the city and County of San Francisco by DKS Associates). Peak hour trip generation estimates were developed using this maximum daily attendance and patterns of visitor arrivals and departures to and from the Northern Waterfront. The analysis of project impacts is intentionally conservative; as a means of comparison, the Monterey Aquarium, which currently limits admission to 10-,000 daily visitors, has 70,000 square feet of public exhibit areas and observation decks as compared to 41,100 square feet for the proposed project.

[4]Based on the actual market penetration of the Monterey Bay Aquarium in its first three years of operation. Further information concerning the unconstrained attendance demand of the project is available in the City and County of San Francisco, Underwater World Aquarium at Pier 39: Traffic and Transportation Study, by DKS Associates.

[5]Documentation of methodology used to derive estimates of new versus linked trips is contained in the Underwater World at Pier 39: Traffic and Transportation Study, (1988) prepared for the City and County of San Francisco by DKS Associates.

[6]City and County of San Francisco, Northern Waterfront Traffic and Transportation Study, Final Consultants Report, by DKS Associates, March 1987, p. A-1.

[7]City and County of San Francisco, Department of City Planning, Northern Waterfront Traffic and Transportation Study, Final Consultant's Report, by DKS Associates, March, 1987, pp. A-14 to A-27. The mode split for the project was developed from retail surveys of travel to the Northern Waterfront. The retail mode split was used since it is the best factual data on travel to the Fisherman's Wharf area that reflects regional

travel patterns. Based on mode split information from the Monterey Bay Aquarium, the percentage of trips made by tour buses for the project is greater than the percent of trips by tour buses based on the retail surveys.

[8]Traffic counts conducted by DKS Associates, 1986 and 1987.

[9]Based on telephone communication with Rebecca Kohlstrand, Department of City Planning, April, 1987.

[10]City and County of San Francisco Planning Code, Article 1.5

[11]DKS Associates, Northern Waterfront public parking survey Thursday, July 9, 1987.

[12]DKS Associates, pedestrian counts taken March 18, 1987, March 21, 1987, and August 8, 1987 (east of Pier 39); March 29, 1986 and August 8, 1987 (West of Pier 39).

[13]The projects include Underwater World, 111 Chestnut Street (residential with some retail), and 55 Francisco Street (office).

[14]City and County of San Francisco, Northern Waterfront Traffic and Transportation Study, Final Consultants Report, by DKS Associates, March 1987, pp. A-6 to A-27

[15]Weekday surveys of office employees at 201 Filbert Street (February 1985, by the Department of City Planning) and Haslett Warehouse (April, 1986 by DKS Associates).

[16]Growth in background traffic in the Northern Waterfront was assumed to occur due to increased tourist activity not associated with new land uses. That is to say, if no change in land use occurred in the study area, the attraction of Fisherman's Wharf would generate new trip activity due to increased tourism. The estimate of growth was based on historical tourism trends projected forward 15 years. (San Francisco Visitors and Convention Bureau, 1985).

[17]City and County of San Francisco, Northern Waterfront Traffic and Transportation Study, by DKS Associates, March, 1987, pp. 25-29.

[18]Based on conversations and data provided by Bill Wycko and Rebecca Kohlstrand, San Francisco Department of City Planning, August, 1986 and February, 1988. Bus boarding and alighting data based on route profile reports prepared by MUNI, Spring 1984, and Department of City Planning boarding and alighting counts, Spring 1986. Cable car data provided by the MUNI Information Office and the Department of City Planning.

[19]California Department of Transportation, I-280 Transfer Concept Program - Subtask 2.2.2: Transportation Performance Measures, by DKS Associates, July 1983, Tables VII-4 and VII-5.

D. AIR QUALITY

In the initial year the proposed project would result in an increase of up to 1,560 (see Table 9 p. 95) vehicle trip ends (vte) over existing volumes. In future years this would drop to up to 1,170 (see Table 9). Air quality impacts on local intersections and freeway on-ramps would not be measurable (see Chapter IV, Transportation for a discussion of trip generation).

The Bay Area Quality Management District (BAAQMD) considers that development generating less than 2,000 vte per day would not have a measurable impact on air quality and therefore does not require an air quality analysis for such developments. Where cumulative development could measurably contribute towards regional and/or local emissions, the District may require an air quality analysis.[1] Project-generated emissions would be less than the threshold established by the BAAQMD.

Nitrogen oxides (NO_x) and hydrocarbons (HC) are both chemical precursors of ozone. Motor vehicles emit more NO_x than HC, and the emissions from building natural gas combustion would consist primarily of NO_x. As demonstrated by the Livermore Regional Air Quality model (LIRAQ) regional ozone computer simulations conducted for the 1982 Bay Area Air Quality Plan, an increase in the future NO_x emissions compared to HC emissions would lead to a decrease in ozone compared to present levels. As future NO_x emissions from cumulative development in San Francisco would exceed future HC emissions, this development would not lead to an increase in total Bay Area ozone concentrations.

At the same time, total emissions of both NO_x and HC are expected to decrease in San Francisco. Total NO_x emissions would decrease in San Francisco by about two percent from 1984 to 2000, but would increase in the Bay Area by about 5% from 1984 to 2000. It is possible that excess NO_x emissions generated by cumulative development could increase ozone and/or nitrogenous oxidant concentrations further downwind, outside the Bay Area. In addition, NO_x emissions generated by cumulative development throughout the Bay Area could increase acid rain further downwind, outside the Bay Area, though to a relatively small extent due to the magnitude of the increase and to dilution over time and distance.

Emissions of particulates resulting from construction and from vehicle trips generated by the projects and cumulative development would increase TSP concentrations, which could increase the frequency of the particulate (PM-10) standard violations in San Francisco, with concomitant health effects and reduced visibility.[2]

Emissions of sulfur oxides (SO_x) generated by the projects and by cumulative development would not bring San Francisco's sulfur dioxide (SO_2) concentrations measurably closer to violating the standard.

The 1982 Bay Area Air Quality Plan contains strategies which consist primarily of HC and CO emission controls on stationary sources and motor vehicles, and transportation improvements, and are aimed at attaining the federal ozone and CO standards. As discussed above, emissions associated with cumulative Northern Waterfront area development are not projected by this EIR to increase ozone concentrations, and thus would not conflict with the objectives of the 1982 Bay Area Air Quality Plan regarding ozone.

Because the project would generate traffic below the 2,000 vte per day threshold established by the BAAQMD, the project's effects on air quality would not be considerable when viewed in conjunction with the effects of cumulative development.

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[1] Future traffic from cumulative Northern Waterfront area development was modeled in the Northern Waterfront Traffic and Transportation Study, Final Consultants Report, March 1987.

[2] State standards for particulate matter changed in 1983 and federal standards changed in 1987 to concentrate on fine particulate matter which has been demonstrated to have health implications when inhaled (PM-10). Only those particulates 10 microns or less in size are measured under the PM-10 standard. The BAAQMD (Thomas Perardi) has stated that TSP includes about 50-60% of particulates of 10 microns or less; thus, the TSP standards are generally equivalent to the PM-10 standards. BAAQMD is presently monitoring PM-10 at seven Bay Area monitoring stations, including the 16th and Arkansas station in San Francisco.

E. WATER QUALITY AND MARINE BIOLOGY

IMPACTS

To understand how the proposed Pier 39 aquarium might effect water quality it is necessary to understand how the water system works. The aquarium would consist of a large tank with a capacity of 707,000 U.S. gallons. Water in the aquarium would be continuously recirculated. The recirculating water would pass through a filter to remove particulate material and ensure that the water in the aquarium remains clear. A small amount of water would be continuously discharged from the recirculating system into the Bay. A corresponding small amount of water would be drawn from the Bay to make up the volume in the aquarium tank. The make-up water would pass through a separate pre-filter and be disinfected with ozone before being added to the aquarium – this would prevent parasites and bacteria present in Bay water from entering the aquarium.

The aquarium would produce two wastewater discharges that could potentially affect Bay water quality. The first would be a generally continuous discharge from the recirculating system. This discharge, referred to as the blowdown, would have a flow rate ranging from 50 gallons per minute (0.07 mgd) to 270 gallons per minute (0.38 mgd). The quality of blowdown water would be identical to the quality of water in the aquarium. It would be chemically similar to Bay water but would contain slightly elevated levels of nitrogen and total dissolved solids and traces of conditioning chemicals used to inhibit the growth of parasites and bacteria. It would be free of bacteria and less turbid than Bay water. Its temperature would be similar to that of Bay water. As would be expected blowdown water would not be injurious to the health of fish and other estuarine organisms; in fact the quality of the water would have been specifically managed to be suitable for aquatic life. The blowdown discharge would be in compliance with all applicable effluent limits and water quality standards and would produce no adverse effects on Bay waters and their denizens.

The second discharge would be the intermittent flow of water used to clean or backwash the filters. Periodically, up to three times per day, the filters would be backwashed with water drawn from the aquarium to remove accumulated particulate materials and to restore the effectiveness of the filters. The volume of the filter backwash discharge

would range up to 20,000 gallons per day. Each backwash episode would last five or six minutes. Backwash water from the recirculating system filters would amount to 15,000 gpd and would be similar in quality to Bay water except that it would have a suspended solids content of about 280 mg/l, a biochemical oxygen demand content of about 113 mg/l and would contain high levels of bacteria. The suspended material would consist primarily of fish feces and excess food particles. Backwash water from the pre-filter or make-up filter would amount to about 5,000 gpd and would be similar to Bay water but would contain an unknown concentration of suspended material previously removed from incoming Bay water.

All wastewater discharges from the aquarium other than aquarium blowdown and filter backwash water would be discharged to the city sewer system. These discharges would include sanitary sewage, washdown water and any discarded water from specimen tanks used for chemical or pharmaceutical treatment of diseased or injured fish or invertebrates.

The filter backwash water discharges would not meet the effluent limits shown in Table 4, page 62, in Section III.E. While backwash from the pre-filter would not meet the suspended solids requirement of 30 mg/l it is unlikely that adverse environmental effects would result because the suspended material would consist of silt and algae previously removed from Bay water. Backwash from the recirculating system filters would have a greater pollution-causing potential but one which could be mitigated by various means.

The project proponent would have to apply to RWQCB for a NPDES permit and abide by any conditions the Board chooses to impose. The exact nature of the permit conditions cannot be known until meetings with the Board staff have been held and a permit application filed. Because of the volume of the discharge and its nature it is possible the Board will waive the requirement for an NPDES permit.

The aquarium would house only those species native to Northern California Pacific and San Francisco Bay waters and so would not represent a source of non-native escapees. Exotic or non-native species inadvertently introduced into the Bay could harm the existing flora and fauna.

During construction, small quantities of potentially hazardous materials, such as solvents, paints, fuel, and resins would be used at the site. The nature of construction is such that no large quantities of fuel or other construction materials would be stored at the site. The risk of a damaging spill is slight but could be reduced further by requiring that the contractor prepare a plan for hazardous materials storage and spill clean-up.

The project footprint of the new platform would be supported by approximately 114 piles ranging from 18 to 48 inches in diameter.[1] Approximately 20,000 sq.ft. of Bay waters would be shaded by the new structure. Only a portion of this would represent new shaded area because the proposed project would replace existing boat slips. Shading of the surface water layers would make conditions under the structure less conducive to phytoplankton growth than elsewhere in the Bay. The severity of any adverse impacts would be limited by the fact that under average tidal conditions a particular water mass would not be underneath the structure for more than one minute. The structure would reduce light intensity in the benthic zone which may cause a shift in community structure toward organisms adapted to low light levels.

Pile driving would destroy benthic organisms inhabiting approximately 1,121 sq.ft. of the Bay bottom. More mobile organisms would be unaffected. During pile driving, sediments would be disturbed, producing a short-term increase in water turbidity.

Approximately 1,121 sq.ft. of benthic habitat would be permanently eliminated by the piles. The piles would provide new habitat for attached intertidal organisms and possibly fish species that prefer reef-like or sheltered habitat.

The new structure could affect water circulation in the vicinity of the site. Earlier studies of the Pier 39 area note that current speeds in the area are high as tidal flow follows the shoreline of the San Francisco Peninsula.[2] Because the new structure would not act as a barrier to flow, no large eddies or quiescent pools would be created. Average current speeds through the area under the proposed structure would be slightly less than they are today (by 10% or less). The frictional effect of the piles would cause the current to slow slightly upstream of the piles and accelerate between the piles. At no time would current speeds be reduced below present levels by a sufficient amount to appreciably affect sedimentation.

[1] Lynn Teasley, Harrison, Teasley & Associates, Inc., telephone communication, July 29, 1988.

[2] City and County of San Francisco, "Negative Declaration for Pier 39 Breakwater System," Appendix A, letter to Pier 39 Limited Partnership from Hugo Fischer, Inc., March 7, 1983.

F. GEOLOGY/TOPOGRAPHY

The proposed aquarium would be constructed on piles in the Pier 39 marina at about +2.4 feet San Francisco Datum (SFD). As discussed in the Geology/Topography Setting Section of this report, the underwater ground material consists of 25 to 51 feet of Upper Bay Mud, 57 to 93 feet of Lower Bay Clay interbedded with dense sand, underlain by Franciscan Assemblage bedrock at -123 to -164 feet SFD.

Upper Bay Mud generally is unsuitable for foundations because of its poor seismic stability and highly variable supporting capabilities.[1] The impacts of supporting the proposed structure on mud would be avoided by setting piles into more stable sands below the mud. A combination pile system would be used which would incorporate end support and friction support. Hollow, pre-cast pre-stressed concrete piles, ranging from 18 to 48 inches in diameter and 70 feet long would be driven into the Lower Bay Clay and dense sand. By driving the piles through the overlying formations into the firm sand, end support for the vertical weight would be developed while the friction from the large diameter piles would ensure against possible up-lift caused by movements of sub-surface materials.

A seismic response study has been completed for the project, analyzing the anticipated soil and structural responses for the design earthquake[2] (the 100-year return event = M 7.25, 9 miles from the site and M 8.25, 22 miles from the site; the 500-year event = M 8.25, 8 miles from the site).[3] The results indicate ground accelerations of 0.30 g and 0.41 g, at the base of the Bay Mud, for the 100-year and 500-year events respectively. The detailed structural design parameters (discussed on pages 14 and 15 of the seismic response study) would be incorporated into the project. The detailed structural design study, taking account of the full seismic interaction of the structure and the foundation soils would be completed by a local California-registered engineering consultant. The project sponsor would follow the recommendations of these investigations for demolition, pile driving and construction at the site.

The structure would be required to meet the specifications of the San Francisco Building Code for seismic design concerning the amount of allowable sway, attachment of partitions and decorative elements, and provision of emergency electricity and water services. During construction, the building contractor would be required to comply with

Section 2903 of the San Francisco Building Code. The Building Code in force at the Port (the same version of the Uniform Building Code used by the Bureau of Building Inspection) requires that new buildings and their foundations be designed by professionally-licensed engineers to meet a series of parameters intended to make new buildings withstand seismic stress. On Port of San Francisco property, this requirement is implemented by the Port Engineering Department as part of the permit review process. As a result, new buildings generally result in less seismic risk than older buildings. Port Engineering Department engineers have expertise in the construction of pile supported structures, and those subjected to the marine environment.[4]

The structural design would incorporate the response of the acrylic tank and tunnel to the design earthquake. The tank would have a conventional reinforced concrete roof as the primary bracing element. The tank would be designed to resist the hydrostatic and lateral dynamic loading of the water contained in the tank. The weight of the water (hydrostatic pressure, or downward force) in the tank would be greater than the lateral dynamic loading (horizontal force) from the water, thereby ensuring stability of the tank. The supporting piles would be cantilevered above the Bay Mud to resist potential seismic loading of the junction between the pile cap and the tank structure.[5]

In a moderate earthquake (7.5 on the Richter scale), minor damage would occur to the tank. In a major earthquake (8.5+ on the Richter scale) severe damage would occur, but there would be no collapse of the tunnel or tank. The acrylic tunnel would be anchored in a gravel base and sealed with an elastic material that could articulate (flex) to prevent fracturing.[5]

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[1] C. H. Lee and M. Praszker, "Bay Mud Developments and Related Structural Foundations," Geologic and Engineering Aspects of San Francisco Bay Fill, California Division of Mines and Geology, Special Report, No. 97, 1969, pages 41 to 86.

[2] Design earthquake - covers all possible seismic parameters that a structural design would have to resist during a major earthquake. This would include: (1) the magnitude of the earthquake, (2) the distance from the site to the epicenter, (3) the lateral ground acceleration produced by the earthquake, (4) the site period (ground response), and (5) direction of the seismic event.

[3]Kaldveer Associates, Seismic Response Study Investigations for Underwater World at Pier 39, San Francisco, California, Project K232-6, prepared for Harrison, Tensley and Associates, Inc., 15 March 1988.

[4]Vello Kisk, Port Engineer, telephone conversation, 1 September 1987.

[5]John Harrison, Engineer, Harrison, Teasley and Associates, Inc., telephone conversation, 22 February 1988.

G. CONSTRUCTION NOISE

Ambient noise in the project vicinity is typical of noise levels in commercial areas of San Francisco, which are dominated by vehicular traffic, including trucks, cars, Muni buses and emergency vehicles.

Construction of the proposed project would take place over about a 14 month period, and would increase noise levels in the surrounding areas. Construction noise levels would fluctuate depending on construction phase, equipment type and duration of use, distance between noise source and listener, and presence or absence of barriers between noise source and listener. To estimate probable noise impacts, this analysis assumes typical equipment and construction techniques. Table 16, page 129, shows typical exterior noise levels associated with the different phases of construction (see Appendix D for a table of typical noise levels found in the everyday environment). With windows open interior noise levels at 50 feet from the noise source would be about 10 to 15 dBA less than those shown in Table 16. Closed windows would reduce noise levels by about 20 to 25 dBA below those shown in Table 16.

Construction noise is regulated by the San Francisco Noise Ordinance (Article 29 of the City Police Code). The ordinance requires that sound levels of construction equipment other than impact tools not exceed 80 dBA at a distance of 100 ft. from the source. Impact tools (jack hammers, pile driver impact wrenches) must have both intake and exhaust muffled to the satisfaction of the Director of Public Works. Section 2908 of the Ordinance prohibits construction work at night, from 8:00 PM to 7:00 AM, if noise would exceed the ambient noise level of five dBA at the project property line, unless a special permit is authorized by the Director of Public Works.

Construction would occur in several stages: demolition and clearance, pile driving, frame erection, and exterior and interior finishing.

Throughout the construction period there would be truck traffic to and from the site, initially hauling away debris and then delivering building materials.

TABLE 16

TYPICAL COMMERCIAL/INDUSTRIAL CONSTRUCTION NOISE LEVELS AT 50 FEET FROM THE SOURCE

Construction Phase	Duration of Phase (Weeks)[1] Proposed Project	Average Noise Level (dBA)
Ground Clearing	1	84
Foundations[2]	8	78
Erection	26	85
Exterior Finishing	26	89

[1] Phases of construction would overlap.

[2] Time includes seven to nine weeks of pile driving. (Noise levels during pile driving could reach 105 dBA at 50 feet.)

Source: Bolt, Beranek and Newman, December 13, 1971, Noise from Construction Equipment and Home Appliances, vs. Environmental Protection Agency.

Ground clearing would involve the demolition of the southeasterly section of the Pier 39 building and road section, as well as approximately 16 boat slips along docks A and B in the marina, as shown in Figure 3, page 19. Pile driving would then occur intermittently over a 7-9 month period in which approximately 114 piles would be driven. Because holes cannot be pre-drilled underwater, engineers would use a high-pressured jet placed inside the four-foot diameter pile. This jet would inject high-pressured water at the base of the pile, forcing Bay Mud away from the path of the pile.[2] Noise levels, when the pile is struck, could reach 105 dBA at 50 feet. The Department of Public Works allows pile driving operations under certain conditions, which may include specifying relatively quiet equipment, predrilling pile holes, and/or specifying hours of operation to reduce the number of people exposed to noise effects.

Other major noise sources during construction would include concrete pumpers, air compressors, generators, haul trucks, power saws, and impact torque wrenches.

The nearest noise-sensitive uses are the shops, restaurants, and offices on Pier 39 itself. Most of these would be shielded from the piledriving by the existing buildings adjacent to the Underwater World site. There are, however, several buildings along the east side of Pier 39 which have operable windows and which would look directly onto the pile driving activity. The next nearest uses are the Academy of Art College, the Blue Shield office building, and the office building on Beach Street between the Blue Shield building and the Academy of Art College. Both the Academy of Art College and the Blue Shield office building have fixed windows, while the office building between them relies on open windows for ventilation. These buildings would all be about 400 feet from the piledriving activity. The next nearest sensitive uses are the Northpoint Apartments. The nearest apartments are about 600 feet from the piledriving area; however, these closest apartments are shielded by intervening buildings. The nearest Northpoint Apartments with line-of-sight to the piledriving activity (across the Kirkland bus yard) are about 900 feet from the piledriving activity. The next nearest uses are the Sheraton Hotel and the Travel Lodge at Fisherman's Wharf, both located about 960 feet from the piledriving area. Rooms in the Sheraton Hotel would have line-of-sight to the piledriving activity while rooms in the Travel Lodge would be shielded somewhat by the intervening parking structure on the block bounded by the Embarcadero, Beach Street, Powell Street and Stockton Street.

At a distance of 50 feet, piledrivers generate noise levels of about 105 dBA as measured on the fast response in the sound level meter.[3] The noise levels inside a building would depend upon its distance from the piledriving activity and the transmission loss of the building facade. The transmission loss of the building facade would primarily depend upon whether the windows facing the piledriving activity are open or closed.

Noise levels inside the offices on the east side of Pier 39 overlooking the piledriving would range from 75 to 90 dBA inside with the windows open and from about 71 to 75 dBA inside with the windows closed. These noise levels would be high enough to interfere with conversation between people in an office and also high enough to interfere with telephone conversation. During piledriving, the noise levels could be expected to be very annoying in these offices. Noise levels inside the restaurants and buildings on the Pier that do not directly face the piledriving (the majority of buildings) would reach 60 to 65 dBA for the

closest buildings and 50 to 55 dBA for those shops at the north end of the Pier. While the noise levels generated by piledriving activity would be audible in the closest shops and restaurants, the noise of the piledrivers would not stand out obtrusively above the relatively high background noise levels in these shops and restaurants.

Noise levels inside the Academy of Art College and the Blue Shield office building would reach 55 to 60 dBA. These noise levels would be audible but would not be expected to interfere with conversation. These noise levels, however, could be annoying to workers in offices directly facing the facility due to their continuous and repetitive nature. Noise levels inside the office building directly opposite the proposed project between the Academy of Art College and the Blue Shield office building would reach 72 dBA, as this building relies on open windows for ventilation. The noise levels generated by the piledrivers would interfere with conversation. If these windows are closed, noise levels would not be expected to interfere with conversation but would be expected to be annoying.

Noise levels inside the Northpoint Apartments that have line-of-sight to the proposed piledriving activity would reach 65 dBA inside with the windows open and about 60 dBA inside with the windows closed. These noise levels would be noticeable during the daytime and could be annoying to people that spend their day at home. These noise levels are high enough to interfere with listening to the radio, watching television, etc. At night, the noise levels would be high enough to interfere with sleep. Similar noise levels would be expected in the Sheraton Hotel. Noise levels in the Travel Lodge would be about five to ten decibels lower (due to shielding by the adjacent parking structure).[4]

Vibration from the impact during pile driving would be felt in adjacent and nearby buildings, especially in the tourist retail shops of Pier 39, offices across the street (Blue Shield) and residences in the North Point Apartments (about 600 feet away). These vibrations have been found to be more disturbing to some people than the high noise levels. General stress reaction has been observed in humans exposed to brief sounds of 76 dBA.[5] Noise levels greater than 70 dBA would require people to close the windows or shout to communicate. Intermittent noises, such as pile driving noise, reduce the perception of control over the environment. This loss of control frequently results in a

depressed mood and depressed motivation.[6] Repeated impulses and intermittent noise of higher level appear more likely to disrupt performance, than continuous or steady noise of comparable level.[7]

In summary, during the majority of construction activities, noise levels would be expected to be at or above existing levels in the area. There would be times, particularly during the operation of pile drivers or impact wrenches, when noise would interfere with indoor activities of the surrounding buildings, and the retail shops and restaurants on the rest of Pier 39. The project sponsor would notify shop owners on Pier 39 of the piledriving activity. Notification was given to shop owners when the Pier 39 Breakwater was installed.

The proposed project would include several mitigation measures which would contribute to a lessening of potential construction noise impacts from the projects, including requirements that impact tools and equipment used at the project site have intake and exhaust mufflers, and that contractors use electric rather than diesel equipment, construct a noise barrier around the site and use a hydrojet to minimize the number of blows per pile. The project sponsor has also agreed to limit the hours of pile driving operation to the hours of 8:00 AM to 6:00 PM to minimize interference with people sleeping in the nearby Northpoint apartments. The impact of piledriving activity would be minimized by using the hydrojet technique as proposed by the project engineers. The benefits of this method are that by using the hydrojet to remove material from in front of the pile, it reduces the number of blows necessary to seat the pile.

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[1] A decibel (db) is a logarithmic unit of sound energy intensity. Sound waves, traveling outward from a source, exert a force known as sound pressure level (commonly called "sound level"), measured in decibels. A dBA is a decibel corrected for the variation in frequency response of the typical human ear at commonly encountered noise levels. Leq is the equivalent steady-state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same time period. Lmax is the maximum noise intensity reached during the period of time of the measurement.

Ldn, the day-night average noise level, is a noise measurement based on human reaction to cumulative noise exposure over a 24-hour period, taking into account the greater annoyance of nighttime noises; noise between 10 PM and 7 AM is weighted 10 dBA higher than daytime noise.

[2]John Harrison, Harrison, Teasley and Associates, Inc., project engineers, telephone conversations, September 17, 1987 and February 29, 1988.

[3]A fast response setting on the sound level meter measures the average noise level for 1/10 of a second. This fast response setting gives a better reading of noises occurring in a short duration (such as piledriving).

[4]Rich Illingsworth, Proposed Pier 39 Aquarium -- Piledriving Noise Assessment, Illingsworth and Rodkin, Inc., letter April 15, 1988.

[5]The Central Institute for the Deaf, Effects of Noise on People, U.S. EPA, 1971.

[6]Sheldon Cohen, et al., "Cardiovascular and Behavioral Effects of Community Noise," American Scientist, Volume 69, October 1981.

[7]National Institute of Occupational Safety and Health, Occupational Exposure to Noise, U.S. Department of Health, Education and Welfare, 1972.

H. GROWTH INDUCEMENT

The Fisherman's Wharf area is the most concentrated area for tourism in San Francisco. With such major attractions as Ghirardelli Square, the Cannery, Alcatraz Island and Pier 39, the area is heavily used and constitutes an important source of revenue for the City. Tourists arrive at the Fisherman's Wharf area by foot, car, cable car, trolley car, bus, taxi, boat and ship (passenger terminal at Pier 35).

The proposed project would result in 41,100 gross square feet of new space in the Fisherman's Wharf area. While it is anticipated that many visitors to the aquarium would visit Fisherman's Wharf with or without the project or stay at hotels in the Fisherman's Wharf area and along the Lombard Street hotel corridor, the proposed project would contribute to additional tourist growth in Fisherman's Wharf. Additional visitors to the area as a result of the proposed aquarium could result in more demand for hotels, restaurants and other tourist-serving commercial activities.

The proposed aquarium would not displace any low-income residents from the project area and would not require any new construction of or extension of public services or utility systems, since it would occur in an already developed urban setting. Most aquarium employees would not be new to the area, and thus would not increase demand on public services.

V. MITIGATION MEASURES

In the course of project planning and design, measures have been identified that would reduce or eliminate potential environmental impacts of the proposed project. Some of these measures have been or would be adopted and implemented by the project sponsors, project architects or contractors, and are proposed as part of the project. Some measures are under consideration and others have been rejected. Implementation of some measures may be the responsibility of public agencies.

Each mitigation measure and its status are discussed below. Where a measure has not been included in the project, the reasons for this are discussed. Any or all of the measures not included in the project could be required by the City Planning Commission to be included as conditions of approval. Measures indicated with an asterisk (*) were adopted as part of the project in the Final Initial Study (see Appendix A, pages A-3 to A-30).

TRANSPORTATION

This section discusses transportation mitigation measures which are included in the project, and measures which are not included in the project but could be proposed by the Department of City Planning and the Department of Public Works to address both project-related impacts and areawide transportation problems. An expanded discussion of these transportation mitigation measures is available in the Underwater World Aquarium at Pier 39 Traffic and Transportation Study.

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

- Time-specific admission tickets would be required to control the visitor flow at a level commensurate with the capacity of the proposed aquarium. The project could not physically accommodate more than 900 visitors per hour. However, the projected attendance demand could be much greater than 900 hourly visitors. Uncontrolled admissions would result in negative transportation impacts in the study area such as

level of service "F" traffic flows and parking demand in excess of supply. The transportation analysis in this document assumes that this mitigation measure would be included in the project until such time that demand falls below the 900 hourly maximum capacity used throughout this study as the basis for analysis of transportation impacts. In future years attendance demand would be expected to stabilize at a level lower than the initial demand. If demand falls below 900 hourly visitors, tickets could be sold at the door up to the 900 per hour maximum in the future without additional negative transportation impacts.

- The project sponsor would increase the capacity of the Pier 39 garage by 100 to 120 spaces by restriping to increase the number of compact stalls (18 spaces), reconfiguring the layout of existing stalls (22 spaces), and increasing valet operations in the garage (60 to 80 additional valet spaces beyond the number of valet spaces used today during peak summer weekends).

- The project sponsor would cause 400 parking spaces to be opened to the public on weekends in order to accommodate additional demand generated by the Underwater World project at the AMPCO parking garage at 80 Francisco Street. Signage would be placed near queuing lines along The Embarcadero and traffic/parking control personnel would help redirect people to the parking garage at 80 Francisco Street.

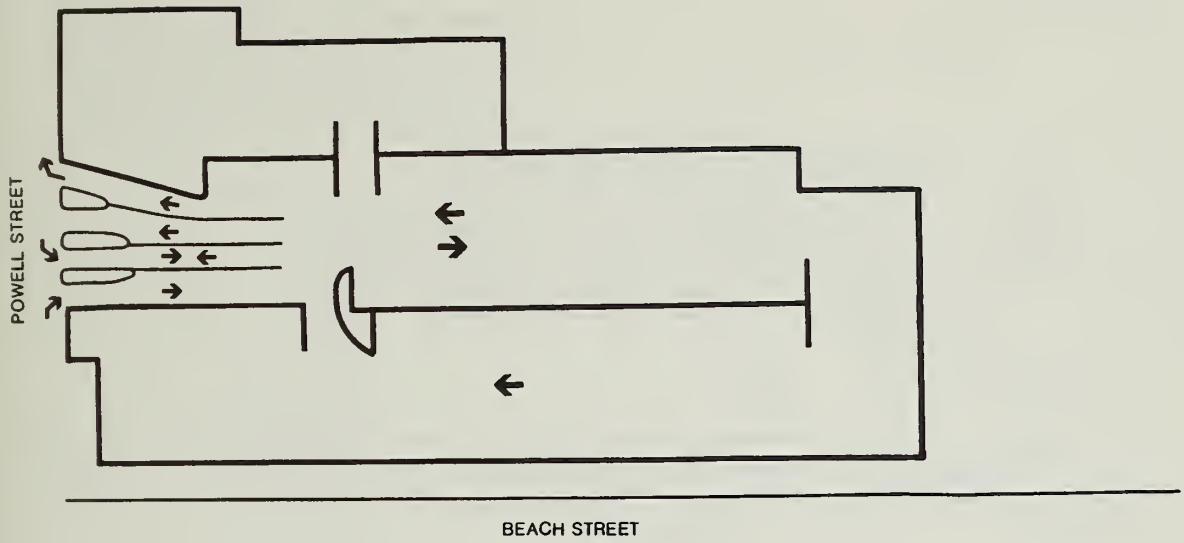
- The project sponsor would modify the existing Pier 39 garage to provide a second garage access point at the Stockton/Beach intersection and by recessing control gates, which would provide additional off-street stacking area, improve circulation in the project vicinity, and reduce congestion at the Powell/Jefferson/Embarcadero intersection (one of the garage circulation alternatives studied would provide a third access, also on Beach Street). Several potential internal configurations for a second garage access at Stockton/Beach were evaluated as part of this analysis, which were narrowed to five schemes as shown in Figure 31 A-C, pages 137 to 139. These five internal garage circulation schemes, in combination with the five external schemes described below, were evaluated based on several criteria, including garage access, on-street parking impacts, pedestrian circulation and safety, off-street stacking capacity, conflicts with the planned MUNI F-Market line, accessibility to remote parking areas, effects on the through traffic capacity of The Embarcadero, and the intersection level of service impacts.

  Three potential alignments of the planned F-line were also analyzed for this study in combination with five external schemes for circulation in and around the Pier 39 garage. The geometric configurations of these five external circulation schemes in the immediate vicinity of the Pier 39 garage are shown below in Figure 32, page 140. These eight criteria for evaluation are based on comparisons of the five schemes to existing conditions and are discussed further below. Figure 33, page 141, compares each garage circulation scheme based on the first seven criteria in tabular form.

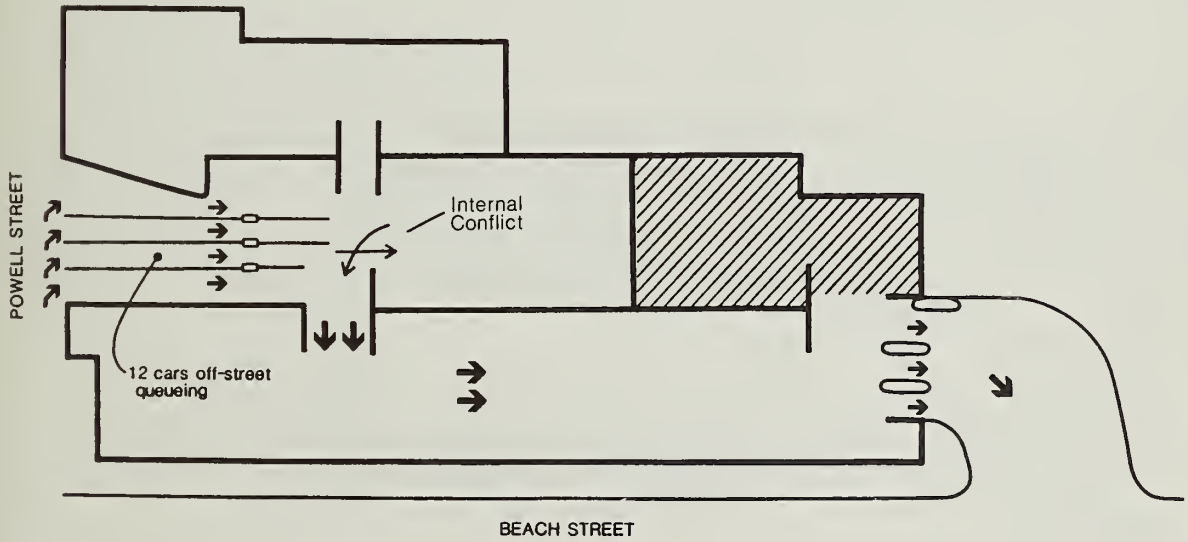
  Garage Access. Scores were higher for access schemes which would be simple to understand, without unusual traffic conditions such as counterflow lanes with left turn access to the garage from The Embarcadero at Powell Street (Schemes 1, 3, and 4). Schemes 2 and 5 would retain the counterflow lane into the garage.

PIER 39 GARAGE INTERNAL CIRCULATION SCHEME

FIGURE 31A



EXISTING SCHEME



SCHEME 1

LEGEND

- Ticket Gate
- Payment Gate
- Area Requiring Lot Attendant Monitoring

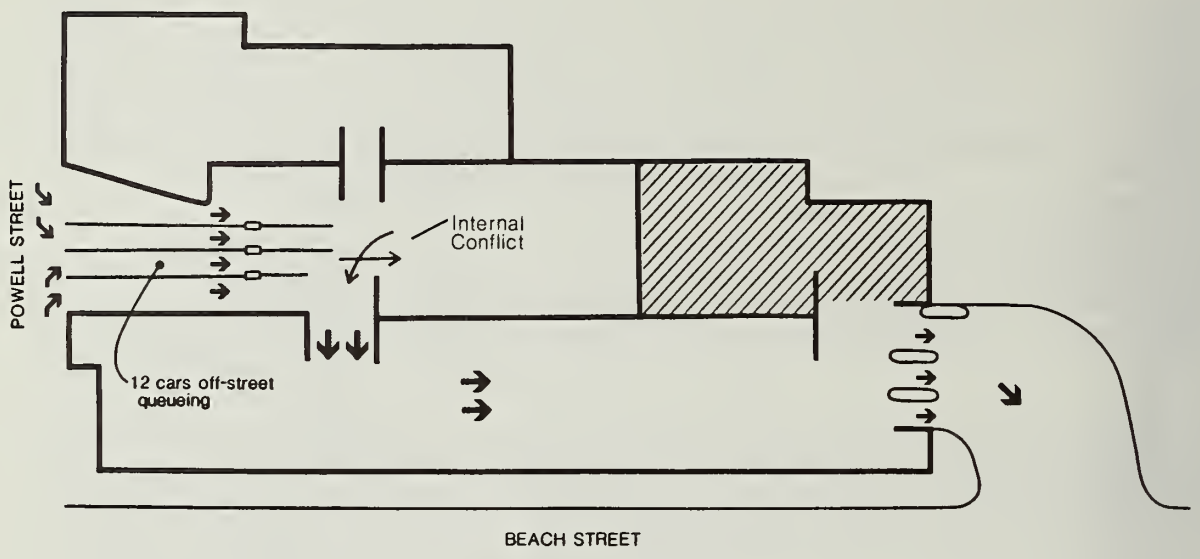
SOURCE: DKS ASSOCIATES

86137

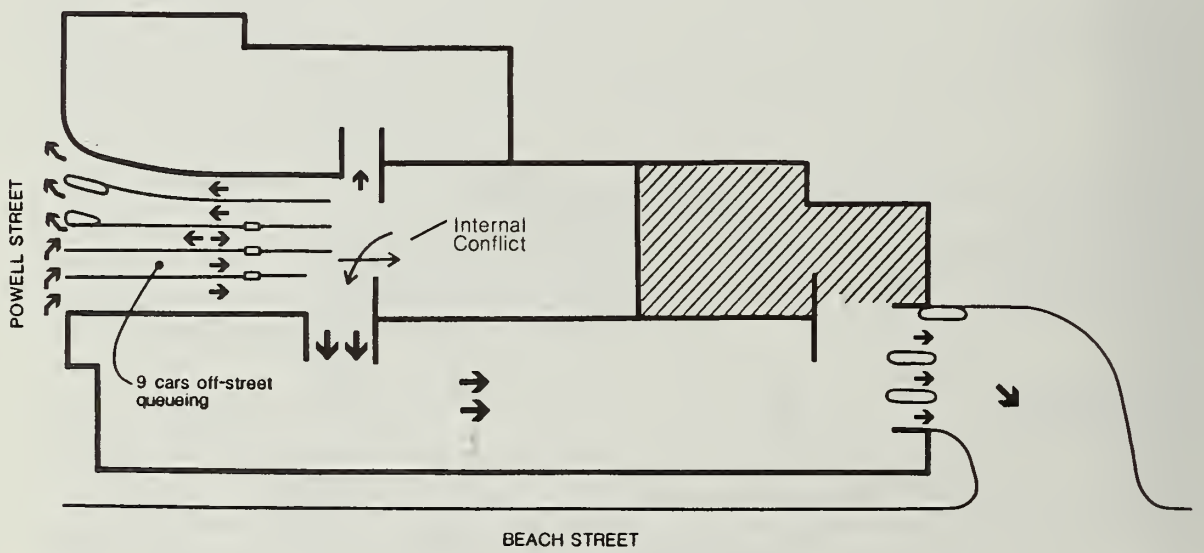
eip

PIER 39 GARAGE INTERNAL CIRCULATION SCHEME

FIGURE 31B



SCHEME 2



SCHEME 3

LEGEND

- Ticket Gate
- Payment Gate
- Area Requiring Lot Attendant Monitoring

SOURCE: DKS ASSOCIATES

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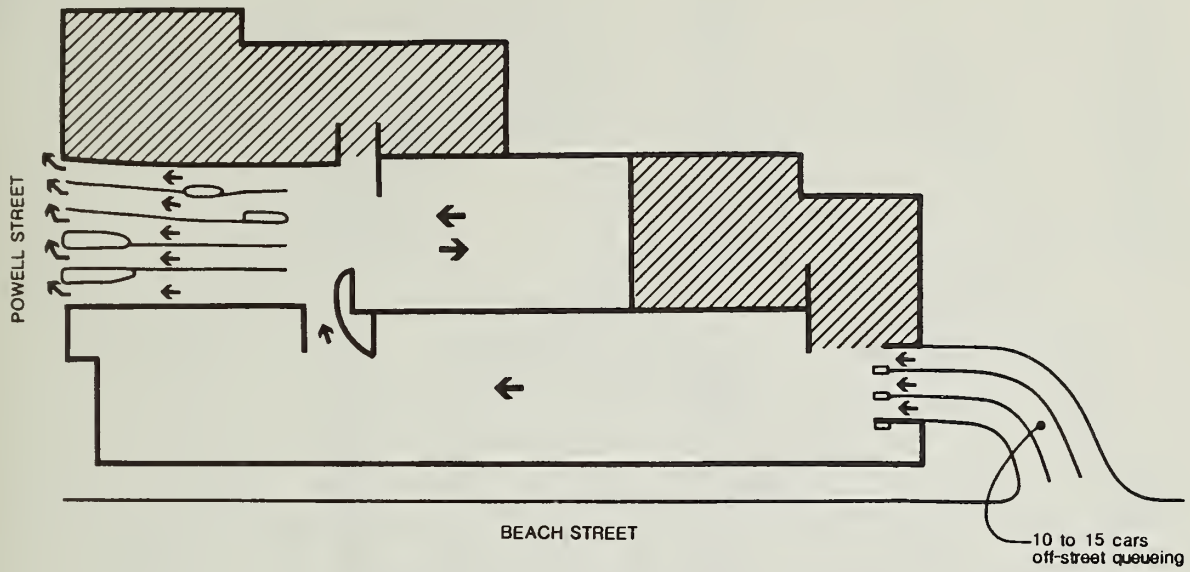
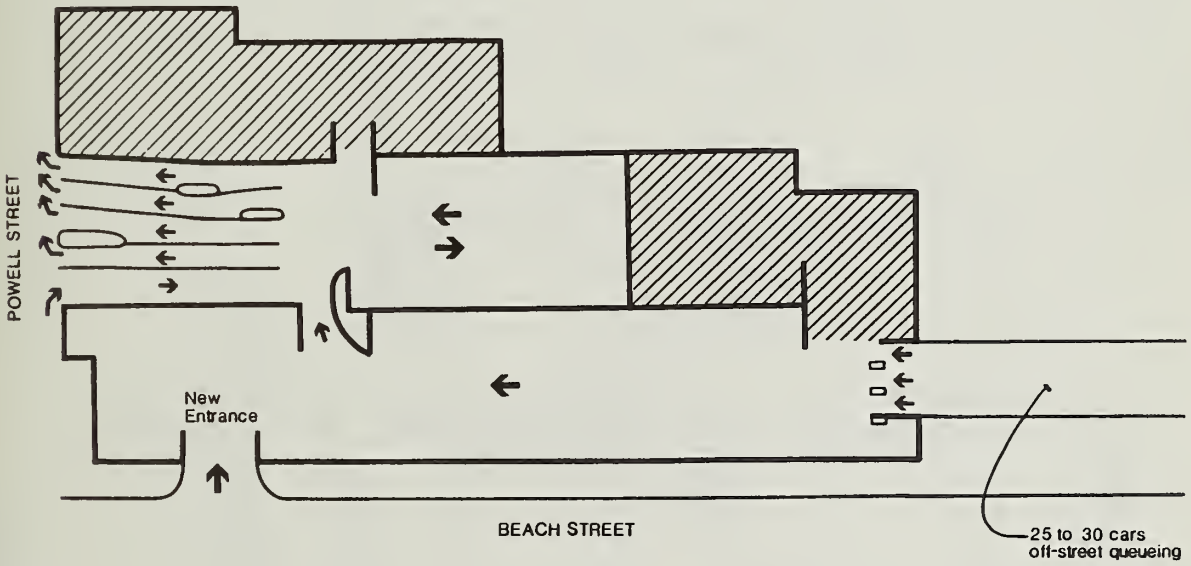
PIER 39 GARAGE INTERNAL CIRCULATION SCHEME

FIGURE 31C



SCHEME 4



SCHEME 5

LEGEND

- Ticket Gate
- Payment Gate
- Area Requiring Lot Attendant Monitoring

SOURCE: DKS ASSOCIATES

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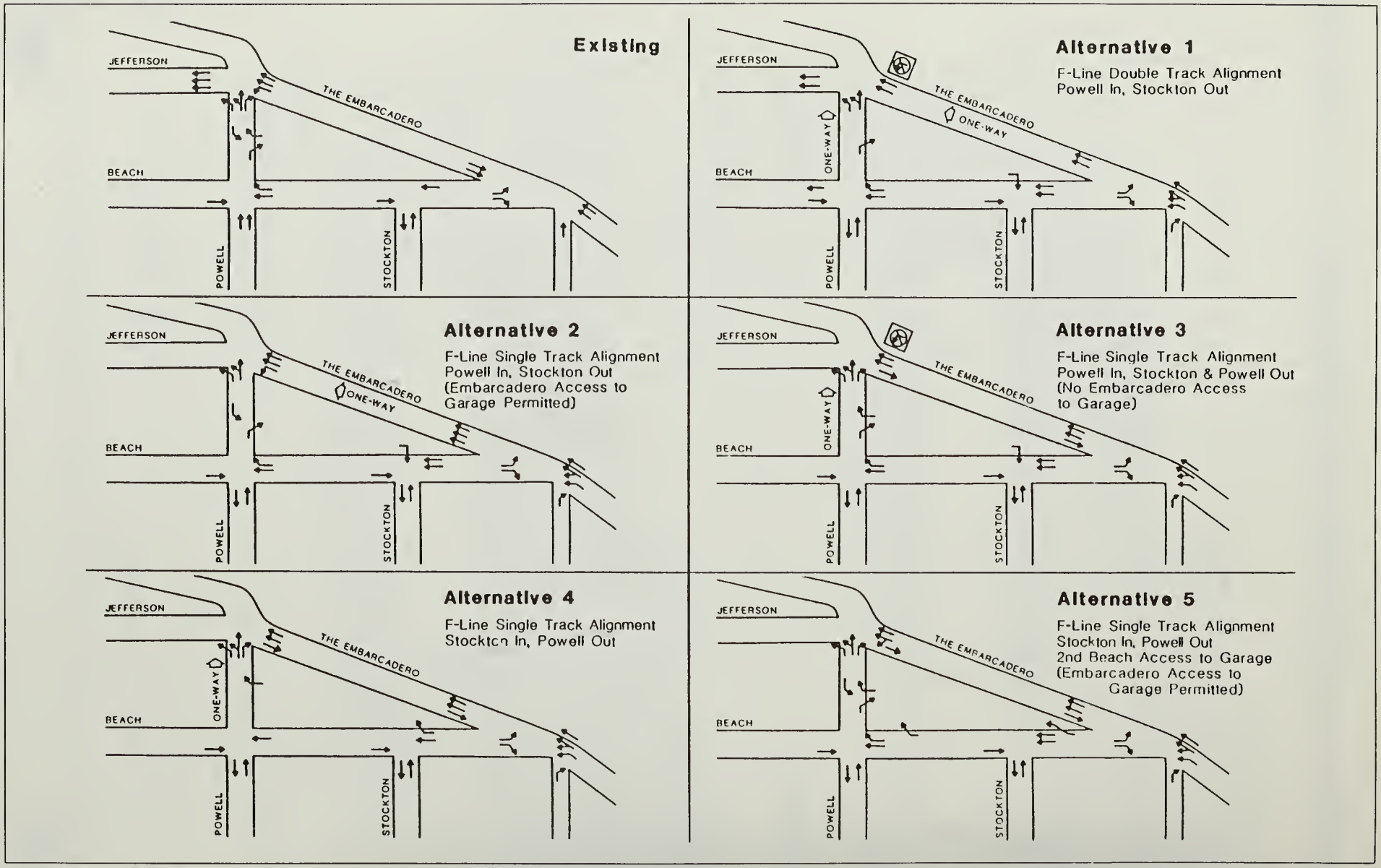
PIER 39 EXTERNAL GARAGE CIRCULATION SCHEME

FIGURE 32



SOURCE: DKS ASSOCIATES

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CRITERIA COMPARISION OF PIER 39 EXTERNAL GARAGE CIRCULATION SCHEME

FIGURE 33

CRITERIA \ CIRCULATION ALTERNATIVE	1	2	3	4	5
1. Garage Access	●	⊖	●	●	◍
2. On-Street Parking	○	○	○	⊖	○
3. Pedestrian Circulation/ Safety	●	○	◍	◍	○
4. Off-Street Garage Stacking	◍	◍	◍	●	●
5. Traffic/F-Line Conflicts	●	◍	◍	○	⊖
6. Access to Remote Parking	⊖	⊖	◍	◍	◍
7. Embarcadero Through Lane Capacity	⊖	⊖	⊖	⊖	○

KEY

- ● Better than Existing
- ◍ Moderate Improvement over Existing
- ⊖ No Change over Existing
- ○ Worse than Existing

Note: Refer to Figures 30A, 30B, 30C and 31.

SOURCE: DKS ASSOCIATES

86137

eip

On-Street Parking. All on-street parking on Beach Street between The Embarcadero and Powell Street would be removed under the four schemes with a Powell Street entrance. Much of this parking is currently used by MUNI buses and tour buses at the Kirkland bus yard, but in the future could be used to provide additional on-street parking. Scheme 4 would remove on-street parking on Beach Street between Stockton Street and The Embarcadero. This loss of approximately nine spaces would be offset by retaining on-street parking along Beach Street in the area currently occupied by MUNI buses.

Pedestrian Circulation/Safety. In general, one-way streets provide safer conditions for pedestrian circulation. Particular importance is placed on the intersection of Powell/Jefferson/The Embarcadero, which carries high volumes of pedestrian traffic. Under Schemes 1, both Powell Street and The Embarcadero would be one-way streets, which would be optimal for pedestrians. Powell Street would also be one-way in Schemes 3 and 4. Alternative 5 would not eliminate any one-way segments. Additionally, the number of garage access points introduces conflicts with pedestrians (i.e. more driveways with multiple movements, such as with Scheme 5, is worse than fewer driveways with simple movements).

Off-Street Garage Stacking. This criterion was evaluated based on the amount of off-street storage provided. All schemes would provide more off-street queuing than the existing garage circulation, with Schemes 4 and 5 providing the most additional off-street capacity.

Traffic/F-Line Conflicts. A double-track F-Line configuration (Scheme 1) would provide the fewest conflicts between traffic and the trolley line. A traffic signal at Stockton/Beach would minimize conflicts between the F-line and outbound garage traffic under Schemes 2 and 3. Schemes 4 and 5 could potentially conflict with the F-line if queues on Stockton Street extended into the F-line track.

Access to Remote Parking. This criterion was evaluated based on the ease of access to additional parking at 80 Francisco Street after arriving at the Pier 39 garage. Schemes 1 and 3 would allow drivers to turn left onto southbound Powell to Bay Street and Kearny Street, if Powell Street is converted to two-way operation between Bay and Beach as is presently proposed by the City. If Powell were to remain one-way northbound, drivers would be able to circle around the Pier 39 Garage to The Embarcadero under Scheme 3, from which the 80 Francisco Garage would be accessible via Kearny Street. Scheme 5 would provide drivers choosing the Beach Street entry with a direct route to the 80 Francisco Garage, but drivers using the Powell Street entrance could not leave the queue on Powell. The remaining schemes either would not permit cars to leave the queue once in it due to the counterflow lane on Powell Street (Schemes 2 and 5), or would direct drivers to first drive several blocks away from the 80 Francisco garage (Scheme 1).

Embarcadero Through Capacity. Alternatives 1-4 each would retain two through lanes on northbound Embarcadero between Beach and Powell Streets either by eliminating the northbound left turn access into the garage or eliminating southbound traffic. Alternative 5, would retain both the northbound left turn garage access and the southbound lane. In combination with the F-line in the northbound curb lane, this would reduce the through traffic capacity of The Embarcadero northbound.

Level of Service. The results of the intersection level of service comparison are shown in Table 17, page 143. All level of service analysis is based on the future weekend cumulative development scenario (Hotel/Retail scenario "A"), and includes

TABLE 17

LEVEL-OF-SERVICE COMPARISON
PIER 39 EXTERNAL GARAGE CIRCULATION SCHEMES

Intersection	CIRCULATION ALTERNATIVE[1] Level-of-Service (Volume-to-Capacity Ratio)				
	1	2	3	4	5
Powell/Jefferson/ The Embarcadero	B (0.66)	C (0.75)	B (0.66)	B (0.66)	C (0.75)
Powell/Beach (with existing 3-way stop)	F (1.19)	F (1.17)	F (1.18)	F (1.21)	F (1.17)
Powell/Beach (with 2-phase signal)	C (0.79)	C (0.77)	D (0.80)	D (0.81)	C (0.79)
Stockton/Beach (with existing N/B stop)	N/A	N/A	N/A	A/E	A/C
Stockton/Beach (with split-phase signal)	B (0.69)	B (0.69)	C (0.74)	N/A	N/A
Embarcadero/Beach (with split-phase signal)	B (0.68)	B (0.68)	B (0.68)	D (0.81)	D (0.85)
Embarcadero/ (with North Point split-phase signal)	D (0.83)	D (0.84)	C (0.78)	C (0.72)	C (0.75)
Kearny/Bay	B (0.65)	B (0.65)	B (0.66)	B (0.65)	B (0.65)
Embarcadero/Bay	C (0.77)	C (0.76)	C (0.75)	C (0.76)	C (0.75)
Kearny/Francisco	A/A	A/A	A/A	A/A	A/A

[1]See Figures 31 and 32 for illustrations of circulation alternatives.

Source: DKS Associates

an estimate of the existing traffic which would occur with planner changes in signing and striping along The Embarcadero. These changes could divert traffic from northbound Embarcadero to Bay, North Point, and Beach Streets.

With traffic signals installed at Powell/Beach, Embarcadero/Beach, Embarcadero/North Point, and Stockton/Beach (in the case of Pier 39 garage traffic exiting at Stockton), acceptable levels of service could be maintained (LOS "D" or better) at all study area intersections with future development and the F-line extension.

- The project sponsor would enforce a policy of "waving off" drivers waiting to enter the Pier 39 garage once the garage fills on weekends, by closing the entrance to the garage (with cones, rope, or similar means) and directing drivers to additional parking at the 80 Francisco Street garage. The queue for the Pier 39 parking garage currently extends along The Embarcadero on weekends during the tourist season, which impedes traffic flow and roadway capacity. Other garages in the Northern Waterfront (e.g., Ghirardelli Square and The Anchorage) do not experience on-street queuing. A "wave-off" policy would eliminate on-street queuing at the Pier 39 garage. Visitors likely would be able to reach available parking and hence the proposed project in less time is directed to the 80 Francisco Street garage than if allowed to queue along The Embarcadero, which at peak times results in 10 to 20 minute delays.

  Potential measures which would help to direct drivers to the additional parking at 80 Francisco Street include modifying the existing Pier 39 garage sign at the corner of The Embarcadero/Beach, placing sandwich boards along The Embarcadero and Sansome Street directing drivers to the 80 Francisco Street garage, and supplying traffic/parking control personnel to direct people to additional parking (similar to the system used at Jack London Waterfront in Oakland). The project sponsor could post signs or use similar informational aids to direct visitors to the project site from the 80 Francisco garage. Pedestrians could be directed north on Kearny Street to North Point Street, and from there along the west side of The Embarcadero past Beach Street to the existing signalized pedestrian crossing north of Beach Street leading to Pier 39. The distance from the 80 Francisco garage to Pier 39 is approximately 1,500 feet, which is about 400 feet greater than the length of Pier 39.

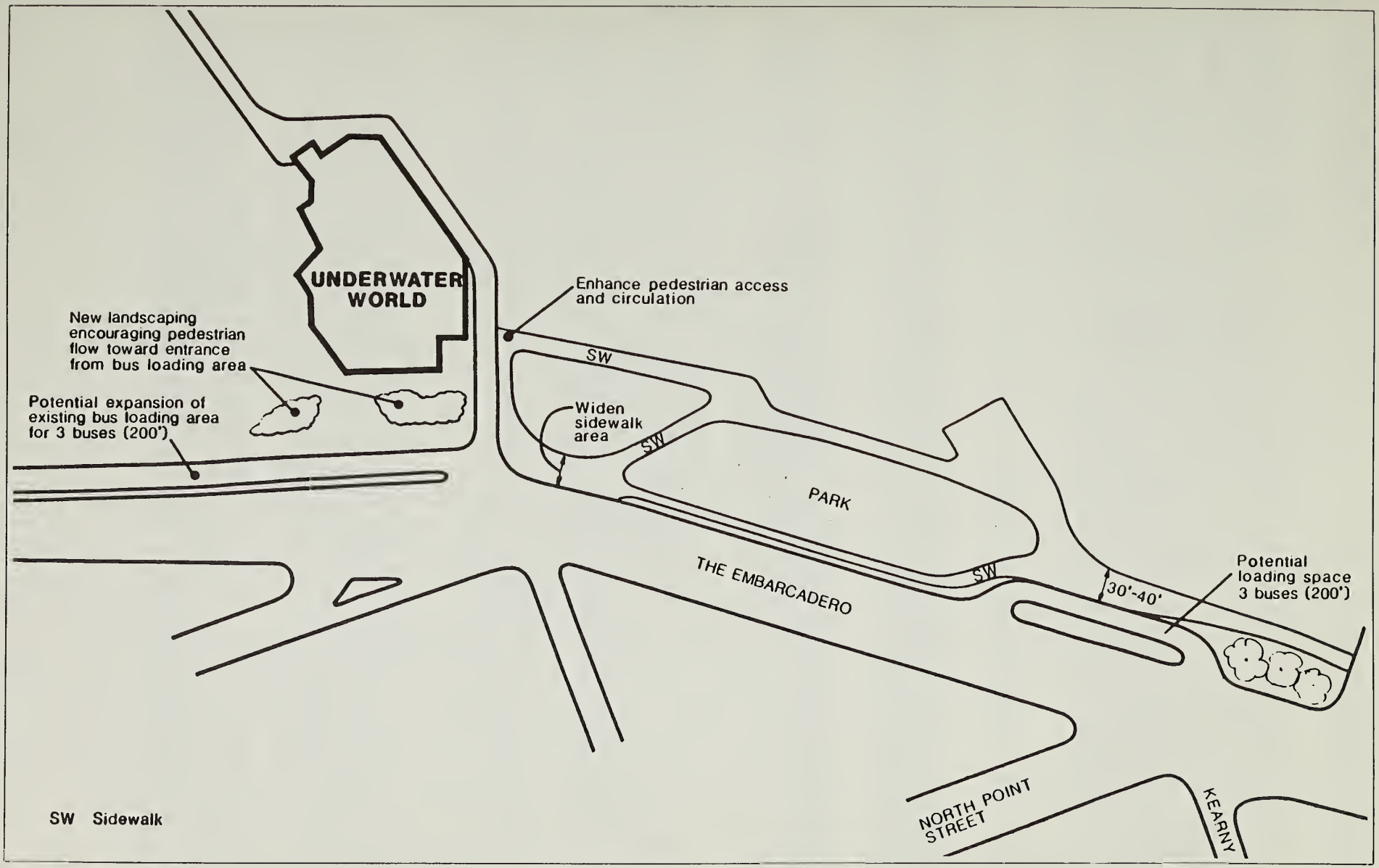
- Construction activity at the project site would be limited to the 9:00 AM to 3:30 PM time period to help reduce impacts on peak traffic flow.

MEASURES NOT INCLUDED IN THE PROJECT

- The project sponsor could provide additional areas for bus and passenger loading. Several potential locations were considered which could provide additional loading areas (Figure 34, page 145). The existing Pier 39 bus loading area could be extended by approximately 200 feet to the west along The Embarcadero to accommodate the additional loading demand of the project. A second potential site for additional loading area would be east of the project site adjacent to The Embarcadero. This site would not be within the control of the project sponsor. A third potential site for additional bus loading space is the Powell/Jefferson/Embarcadero intersection. Several improvements could be proposed for this intersection by the Department of City Planning and Department of Public Works. As part of these improvements, additional bus loading area could be provided on The Embarcadero immediately north of the intersection. Pedicab operators who would be displaced y additional bus

POTENTIAL PEDESTRIAN AND PASSENGER LOADING SITE IMPROVEMENTS

FIGURE 34



SOURCE: DKS ASSOCIATES

NO SCALE

loading space could be relocated immediately north of their current location, where they would be favorably positioned to meet disembarking passengers. Excess parking could be removed from this area, a curbline delineated, and pedestrian circulation routes defined, which would serve to provide Wharf visitors with a sense of direction as they continue walking west from Pier 39. Piers 35 and 45 could potentially provide additional tour bus loading areas. These locations would be less desirable, however, due to greater distances from the project site and competing uses for waterfront area which would tend to make use of the Piers for additional loading space not viable. Any of these potential bus loading areas would result in a loss of open space, and would need to be approved by the Bay Conservation and Development Commission.

AREAWIDE MITIGATION MEASURES

- The Department of City Planning and the Department of Public Works could implement a one-way couplet system using Bay and North Point Streets to reduce traffic conflicts, improve public safety, and improve circulation in the Northern Waterfront area.

  This circulation mitigation measure was proposed and analyzed in the Northern Waterfront Traffic and Transportation Study, and in the background transportation study for this EIR. A one-way couplet could improve access to the Wharf, reduce delay, and minimize conflicts between turning and through traffic streams, as traffic turning off Bay or North Point into the study area would not face opposing traffic.

  No key intersections which function as "gateways" to the Northern Waterfront would experience Level of Service "F" conditions during weekday or weekend peak-hours with one-way couplet. (These key intersections include Columbus/Bay, Embarcadero/North Point, Franklin/Bay, Van Ness/Bay and Embarcadero/Bay.) This would result in improved traffic performance with future development as compared to conditions which would be provided by the existing circulation system. The total number of intersections in the area-wide study area operating at LOS "D" or worse in the horizon year on weekdays would decrease from seven with existing circulation (including one at LOS "F") to five on weekdays, with none at "F". On weekends the number of intersections operating at LOS "D" or worse would decrease from eight with existing circulation (including four at LOS "F") to three with the couplet, including two at LOS "F."

  In general, traffic conditions in the future with the Bay/North Point couplet would be similar or better than existing traffic conditions on Bay Street, with delay due only to left-turning vehicles and loading activity substantially reduced. However, while traffic would operate better on Bay Street, North Point Street would carry more traffic. Signalization of Embarcadero/North Point would be needed regardless of the future land use scenario or circulation system that is ultimately developed.

- The Department of City Planning and Department of Public Works could propose to implement the extension of Mason Street to The Embarcadero. This improvement would decrease the volume of traffic and improve intersection operating conditions at the Powell/Jefferson/Embarcadero intersection by drawing a portion of Powell Street traffic onto Mason Street.

CONSTRUCTION NOISE

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

- The construction contract would require that the project contractors muffle and shield intakes and exhaust, shroud or shield impact tools, and use electric-powered rather than diesel-powered construction equipment, as feasible, so that noise would not exceed limits in the City's Noise Ordinance (Article 29, San Francisco Police Code, 1972).

- The general contractor would construct barriers around the site, and around stationary equipment such as compressors, which would reduce construction noise by as much as five dBA.

- The project sponsor would require that the construction contractors limit pile driving activity to the hours between 8:00 AM and 6:00 PM. This would require work permits from the Director of Public Works pursuant to the San Francisco Noise Ordinance Section 2907(c).

- Preconstruction surveys would be needed to establish the potential effects of vibration from pile driving. A vibration monitoring program would be maintained throughout the pile-driving phase of construction.

WATER QUALITY AND MARINE BIOLOGY

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

- The project sponsor, prior to initiation of project construction would require the general contractor to prepare a plan for the storage of hazardous materials and for their clean-up in the event that a spill should occur.

- Only aquatic species native to Northern California Pacific and Bay Waters would be contained in the aquarium.

Other mitigation measures to be implemented as part of the project would be determined by RWQCB requirements, but could include one or more of the following:

- Install diffuser pipe to induce rapid mixing and dilution of backwash water with Bay water.

- Backwash recirculating filters with municipal water and discharge backwash to City sewer.

- Route backwash water to a settling tank to remove most of the particulate material before discharge to the Bay.

- Disinfect backwash water before discharge.

CONSTRUCTION AIR QUALITY

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

* The project sponsors would require the general contractors to maintain and operate construction equipment so as to minimize exhaust emissions of TSP and other pollutants, by such means as a prohibition of idling motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs (to reduce emissions) for equipment that would be in frequent use for much of the construction periods.

VISUAL QUALITY

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

* In order to reduce obtrusive light or glare, the project sponsor would use no mirrored glass on the building.

HAZARDS

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

* Evacuation and emergency response plans would be developed by the project sponsor, in consultation with the Mayor's Office of Emergency Services, to ensure coordination between the City's emergency planning activities and the project plans, and to provide for building occupants in the event of an emergency. The project plans would be reviewed by the Office of Emergency Services and implemented by building management insofar as feasible before issuance of final building permits by the Department of Public Works.

GEOLOGIC MITIGATION MEASURES

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

- During construction, the building contractor would be required to comply with Section 2903 of the San Francisco Building Code.

- To facilitate penetration of soils with a minimum amount of noise and vibration from pile driving, the pile locations would be predrilled using hydro-jets.

- The project sponsor has obtained a site-specific soil report from a California-licensed geologic engineer and would construct the project in accordance with the recommendations of that report regarding foundation and structure.

- Preconstruction surveys would be made to establish the potential effects of vibration from pile driving. A vibration monitoring program would be maintained throughout the pile driving phase of construction.

LAND USE

MEASURES PROPOSED TO BE INCLUDED IN THE PROJECT

- In order to mitigate the loss of landscaped and nonlandscaped pedestrian open space on land and open space over water, the Project Sponsor would provide a series of improvements around the perimeter of Pier 39 to enhance the perimeter as a walking tour of the waterfront. Such improvements would include: (1) Creation of six protected pedestrian overlooks, cantilevered over water from the existing and relocated perimeter walk/roadway. These protected overlooks would include amenities such as benches, viewfinders, low level night lighting to highlight the presence of the pedestrian areas, special displays on the content of the views from the overlook and other pedestrian amenities. (2) Enhancement of pedestrian protection from vehicles at the north end of the pier by the installation of bollards. (3) Expansion of the second level deck and overlook at the end of Pier 39.

VI. SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

This chapter identifies impacts that could not be eliminated or reduced to an insignificant level by mitigation measures included as part of the proposed project as described in Chapter V, Mitigation Measures.

The following significant environmental impacts resulting from the proposed project and other potential developments have been identified. The final determination of significant impacts will be made by the City Planning Commission as part of their certification action. Chapter VI will be revised, if necessary, to reflect the City Planning Commission's findings, before printing of the Final Environmental Impact Report.

The project would require approximately 200 feet of new passenger loading area to meet the estimated peak demand for taxi, limousine, tour bus, and van loading space. Without this loading space, congestion on The Embarcadero could worsen, and conflicts with the proposed MUNI F-line could occur, resulting in a significant effect on the environment. This impact could be reduced by one of several mitigation measures which are identified in Chapter V, Mitigation Measures. These mitigation measures are not all within the control of the project sponsor. They would require actions by the City Planning Commission, the Department of Public Works, and/or the Bay Conservation and Development Commission. All of these possible mitigation measures would result in a loss of open space.

The project, in conjunction with other reasonably foreseeable development in the Northern Waterfront area, would have a significant effect on the environment in that it would measurably contribute to the degradation of an intersection to unacceptable Levels of Service (LOS) during the weekday PM peak hour (5:00-6:00) and during the weekend peak hour (3:00-4:00). The weekday and weekend analyses assumed different development

patterns in order to conservatively assess traffic impacts for each time period. Whether impacts were concentrated on weekdays or weekends could depend on the type of development which was actually to occur.

During the weekday PM peak hour (5:00-6:00), the intersections of Powell/Beach and Embarcadero/Powell/Jefferson would go from LOS "C" to LOS "E". During the weekend PM peak hour (3:00-4:00), the intersection of Powell/Beach would go from LOS "E" to LOS "F".

VII. ALTERNATIVES

This chapter consists of possible alternatives to the proposed project. For each alternative, the environmental impacts of the alternative as well as the environmental impacts of the proposed project to be avoided are identified. Finally, the project sponsor's reasons for not selecting the identified alternative is provided. Despite the project sponsor's reasons for rejecting an alternative project, the City Planning Commission could approve an alternative project if it determines that the alternative represents a more appropriate use of the site.

The following alternatives are considered: (A) No Project Alternative; (B) Different Waterfront Location Alternative; (C) Entire Project On Existing Pier 39 Alternative; (D) Non-Waterfront Location Alternative. There are two variants of the Different Waterfront Location Alternative which are analyzed. Variant One is an alternative involving construction of the project at Pier 37. Variant Two is an alternative in which the project would be constructed on the waterfront south of the San Francisco-Oakland Bay Bridge.

A. ALTERNATIVE ONE: NO PROJECT

DESCRIPTION

Under Alternative One, the proposed project would not be constructed. This alternative would involve no change to the project site as it now exists. The Pier 39 amusement facility would remain the same with the video games on the first floor. The service road and the sixteen boat slips in the Pier 39 marina to be removed for the proposed project would remain in its existing location.

IMPACTS

If the No Project Alternative were implemented, none of the impacts associated with the proposed project would occur. There would be no impacts on land use or urban design. The existing transportation, air quality, water quality, and parking occupancy conditions would remain as they are but would be impacted by cumulative development other than the proposed project. This alternative would not contribute to cumulative transportation impacts or to increased concentration of commercial recreation and visitor facilities in the area. There would be none of the construction-related impacts described for the proposed project. The environmental characteristics of this alternative would be generally as described in the Environmental Setting Sections of this report (see Chapter III, pages 28 to 69). Cumulative impacts not generated by the proposed project would continue to occur and would impact the environment in the vicinity of the project site.

REASON FOR REJECTION

The project sponsors have rejected this alternative because it would not meet their objectives as outlined in Chapter II. The project sponsors feel that the project as proposed would provide local residents and tourists a popular recreational and educational experience of the marine environment, contribute to a better understanding of marine species indigenous to the San Francisco Bay, and complement other uses in the Northern Waterfront.

B. ALTERNATIVE TWO: DIFFERENT LOCATION ALTERNATIVES

There are two variants of the Different Waterfront Location in San Francisco Alternative. Variant One is an alternative involving the construction of the aquarium at the foot of Pier 37. Variant Two analyzes the construction of the project south of the San Francisco-Oakland Bay Bridge, along the City's southern waterfront.

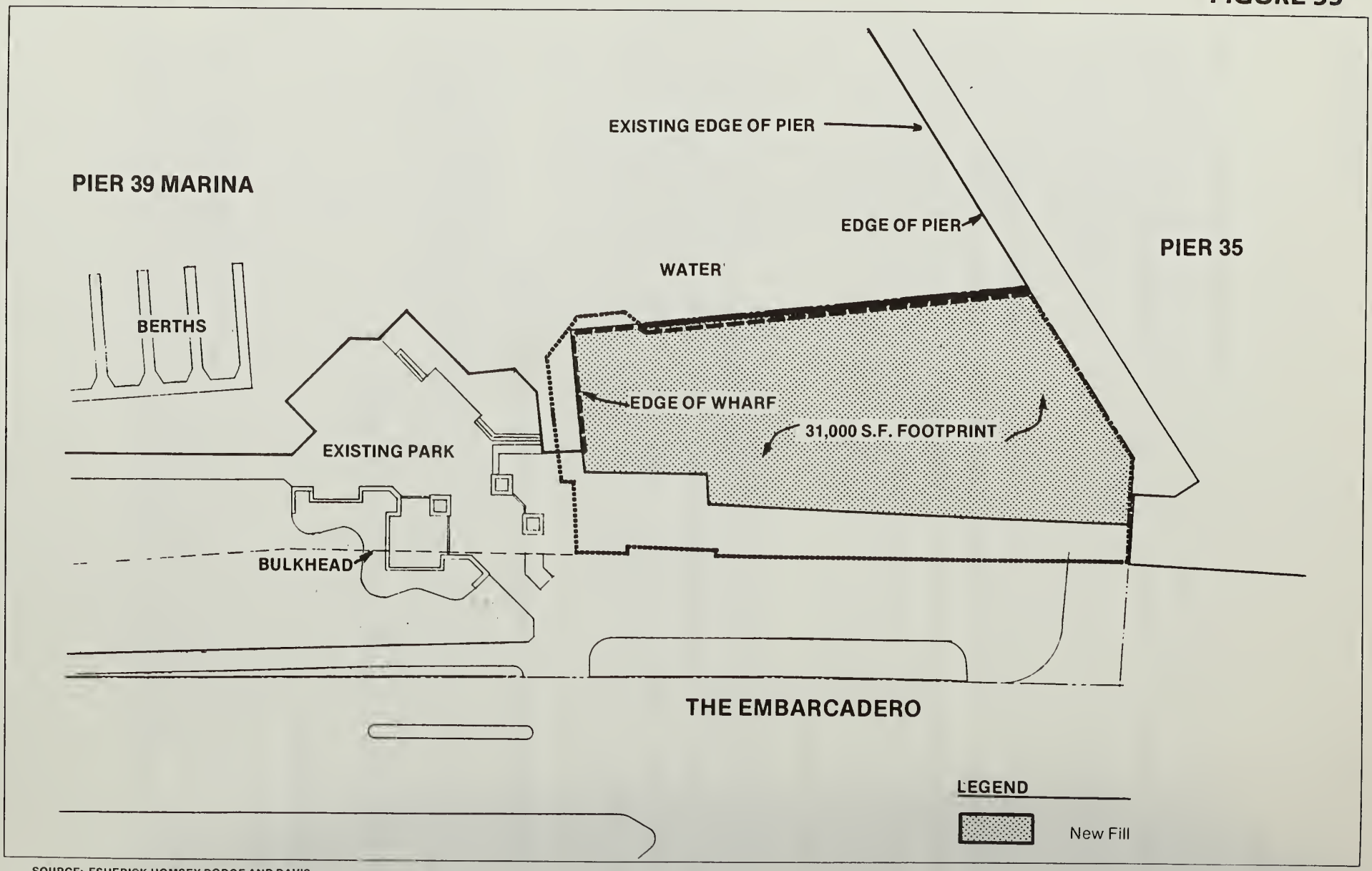
Variant One: Pier 37

DESCRIPTION

This variant of Alternative Two would involve the location of the proposed project at the foot of Pier 37 to the northwest of Pier 35 and east of Pier 39 (see Figure 35, page 154). The site is currently vacant with no building structures adjoining the seawall or piles in

PIER 37 ALTERNATIVE

FIGURE 35



SOURCE: ESHERICK HOMSEY DODGE AND DAVIS

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the water. This alternative would include the same characteristics as the proposed Underwater World project with exhibit area, gift shop, and the aquarium. This alternative would be constructed to be flush with the front facade of the Pier 35 structure. The facade of the building would be typical to that of other pier entries on the Embarcadero with bold concrete facings and an arched entryway with a peaked roof of about 58 feet in height. The remainder of the building would be 36 feet in height.

Since there is no existing structure at the site, this variant of Alternative Two would be constructed on approximately 28,000 square feet of new fill in the Bay (compared to 19,400 with the proposed project), requiring more than 200 piles (compared to approximately 114 with the proposed project). The alternative would extend over 250 feet along the Embarcadero (compared to 160 feet with the proposed project).

This alternative site is part of the area which is required to be improved as public open space as part of the authorization for the development of Pier 39.

IMPACTS

Impacts associated with air quality, operating noise, water quality and marine biology and growth inducement would not change as compared to those described for the proposed project in Chapter IV, Impacts, of this document.

This alternative would be built in an area which is required to be developed as open space as a condition of approval of Pier 39. Its construction would, therefore, result in a loss of an open space resource.

In order to be constructed flush with the Pier 35 structure, this alternative would extend into the existing sidewalk area between Pier 35 and the existing pedestrian space adjacent to the Northern Waterfront Park. Impacts relating to urban design and visual quality would be greater than the proposed project, as the building would extend along the Embarcadero some 250 feet from the existing Pier 35 structure. This would result in blockage of views for 90 feet more than with the proposed project. Views of the Bay would be blocked in both directions of the Embarcadero and looking north along Kearny Street and Grant Street.

It would be expected that the same number of visitors would attend the project as proposed in this Alternative, and thus, transportation impacts associated with volume/capacity flows, vehicular-related air quality emissions, and vehicular-related noise would remain unchanged. However, impacts relating to parking and pedestrian circulation could change. Because Pier 37 is further east from the "core" of Fisherman's Wharf and slightly south, patrons would seek parking in lots close to Levi's Plaza and along Bay, Kearny and Montgomery Streets. For visitors travelling north by vehicle along the Embarcadero, this alternative would encourage an earlier diversion of traffic off Embarcadero before crossing the congested intersection of Jefferson Street, Powell Street and The Embarcadero. As a result, parking-related traffic congestion would be less than that described for the proposed project. As parking alternatives move farther to the south and east, pedestrian activity would also change as visitors walk to and from the proposed project. This would cause increased pedestrian activity at the intersections of North Point Street and The Embarcadero, and Bay Street and The Embarcadero. This latter intersection is dangerous for pedestrians because of its heavy traffic flows and irregular configuration. Under this alternative, improvements to these two intersections and possibly other intersections would be necessary in order to accommodate pedestrians. Pedestrians would be travelling to Pier 37 from the "core" area of Fisherman's Wharf and from the southeastern area of the Embarcadero (south of Bay Street). It is expected that pedestrian impacts related to this alternative would be similar to those described for the proposed project.

Because this alternative would require more than twice as many piles to be driven into the Bay than is currently proposed, impacts relating to construction noise and geology/topography would be greater than those described for the proposed project.

This alternative would require action by BCDC and the City Planning Commission to amend the existing requirement that this space be improved as public open space.

REASONS FOR REJECTION

The project sponsor has rejected this alternative because it would not meet their objectives as outlined in Chapter II. The site is not in the main thoroughfare of Fisherman's Wharf pedestrian activity (as is currently proposed) and the site would require

an increase in the number of piles to be driven (approximately 200) as compared to the number currently proposed (approximately 114). Compared to the proposed project, the project sponsor also believes that there would be greater impacts relating to land use (particularly the loss of potential open space) and visual impacts under this alternative.

In the opinion of the project sponsor, this proposed alternative would not result in any significant environmental benefit as compared to the proposed project, which would outweigh the negative impacts of the proposed alternative.

Variant 2: Aquarium Located on Pier South of San Francisco-Oakland Bay Bridge

DESCRIPTION

Variant 2 of the Different Waterfront Alternative would involve the location of the proposed project on one of the piers south of the San Francisco-Oakland Bay Bridge. Although no specific site has been identified for this alternative, according to the Port,[1] Piers 30-32, or 34, would be deemed most appropriate for this type of use because of either their vacancy or accessibility and/or potential for commercial recreation as identified in the BCDC "San Francisco Waterfront Special Area Plan."[2] For purposes of this analysis only, Pier 30-32 has been selected for environmental study and comparison as an alternative site.

Pier 30-32 is currently a vacant concrete pier that is 622 feet wide and 900 feet long (12.85 acres). Following a fire on the pier in 1984, the Port obtained environmental clearance and all necessary permits to reconstruct a maritime warehouse. However, due to funding limitations, there are no current plans to implement this project.

Under this alternative, the proposed Underwater World would be similar to the proposed project in that it would be two stories and use approximately the same site area of 25,400 square feet. This alternative would include a gift shop, tide pool, exhibits, and function room, the same as the proposed project. Because Pier 30-32 was not designed to support the heavy loads of the tanks, additional piles would need to be added to the existing pier structure. Under the project site there would be approximately 185 piles, consisting of a variety of pile systems, which would have to be removed (25,400 square feet of the

existing pier). After demolition, approximately 114 new 2 to 4-foot diameter piles would be driven into the Bay floor and a concrete base slab constructed on top of the piers.

Due to the large size of Piers 30-32, it is unlikely that the Underwater World project would be the sole occupant of the Pier 30-32 structure. It is expected that this alternative would be built on Piers 30-32 in conjunction with other commercial, recreation and/or maritime activities. This could include a hotel, a passenger ship terminal, and/or retail shops and services.

IMPACTS

Northern Waterfront Impacts

In the Northern Waterfront, there would be no impacts on land use or urban design at or near the proposed project site. The existing transportation, air quality, water quality, and parking occupancy conditions near Pier 39 would remain as they are but would be impacted by cumulative development other than the proposed project. This alternative would not contribute to cumulative transportation impacts or to increased concentration of tourism in the Fisherman's Wharf area. The number of future visitors coming to the Fisherman's Wharf area (including Pier 39) would not be affected under this alternative. Other impacts described for the Fisherman's Wharf area, which were identified for the proposed project, would not occur with this alternative.

North China Basin Area Impacts

1. Land Use

The Pier 30-32 site is located in the M-2 Heavy Industry Zoning District in which commercial recreation uses such as the proposed Underwater World Project are permitted.[3]

Pier 30-32 is situated within the North China Basin Area as described in the Northeastern Waterfront Plan. The primary objective established for this area is, "To enhance the economic vitality of the area and capitalize on its unique location and environmental attributes for both maritime and residential development."[4] The plan calls for continued

break-bulk cargo handling and related shipping activities, "for as long as practical."[5] As maritime activities decrease, the Plan calls for improvement plans to be adopted for the area in which other uses would be approved.

The Northeastern Waterfront Plan encourages continued maritime commercial activity on Piers 26 to 38. If the aquarium project were to be located on Pier 30-32, it would introduce a new type of use to the area.

The BCDC San Francisco Waterfront Special Area Plan establishes guidelines for the use of lands which are under the jurisdiction of the San Francisco Bay Conservation and Development Commission. Under this Plan permitted uses on Pier 30-32 include maritime, public recreation, open space, public access, and commercial recreation. The Special Area Plan policy for this pier states: "Replacement fill for Bay-oriented commercial recreation in the area of Piers 26 through 32 and 46a and 46b should be permitted only if these piers are no longer needed for maritime use, and only if the existing pier structures cannot be used for new uses."[6] The plan recommends mixed use for the area when existing maritime use is phased out.

Between Piers 40 through 46A, a variety of public and other uses are being encouraged in this area, such as a small boat harbor which has been constructed and a park which has been planned for Seawall Lots 333-336. Currently, three major projects are under construction in the area as part of the South Beach Redevelopment Area Project: Bayside Village is an 840 dwelling unit residential project with 16,000 square feet of commercial retail. This project is bounded by First, Bryant, Beale and Brannan Streets. Embarcadero Triangle is a mixed-used development with 65,000 square feet of commercial retail space and 177 dwelling units. This project is bounded by the Embarcadero, First and Brannan Streets. South Beach Marina Apartments is planned for 414 dwelling units and 7,000 square feet of commercial retail space. This project fronts Townsend Street and is between First and Colin P. Kelly, Jr. Streets.

2. Visual Quality

Under this alternative, the project's impacts on visual quality resulting from the blockage of Bay views could, under the worst case, be greater than those for the proposed project.

The exact extent of the impact would depend upon the configuration of the Underwater World on the pier structure. However, the significance of the Bay view blockage at the Pier 30-32 site could be considered to be lessened by the fact that the number of people exposed to the view blockage would be considerably less than at the Northern Waterfront location at Pier 39.

3. Transportation

Visitor trips generated under this alternative would be similar to that for the proposed project site. However, the traffic to Pier 30-32 would be new traffic to the area as compared to the site at Pier 39. There is no existing tourist/visitor population in that area for the aquarium to draw upon for attendance (for example, people going to Fisherman's Wharf who would also visit an aquarium at Pier 39). Without this linked trip component, all trips to a Pier 30-32 site would be new trips. With a similar sized facility, this would be approximately 16,000 person trips per day, including about 2,200 person trips during the weekday or weekend PM peak hour.

Most access for this alternative would be by auto. Based on this the potential share of auto drivers would be about 30 percent. This would represent about 4,800 daily and 660 peak hour new vehicle trips. This represents 470 percent more new auto traffic than projected for the Pier 39 site.[7] On weekends, ample traffic capacity is available in the area to serve the project. With increased residential use in the South Beach area, there could be some limited congestion in the vicinity of Bryant and Brannan Streets near the project site.

Freeway access from all three regional freeways (U.S. 101, I-80, and I-280) would be easier for the Pier 30-32 site as compared to the proposed project site, as this alternative site is in close proximity to several freeway ramps. Traffic from northbound or southbound U.S. 101 would go toward the Bay Bridge and use either of the two Bryant Street off-ramps. From northbound I-280 drivers could take the last northbound exit at Fourth Street, follow Fourth Street to Townsend Street, turn right onto eastbound Townsend Street to The Embarcadero, and from there turn left onto northbound Embarcadero where they would be two blocks from Pier 30-32. Westbound traffic on I-80 could take the Main Street exit, turn right on Market Street, right on Spear Street, and go

five blocks southbound to Pier 30-32. On-ramps to provide freeway access for vehicles leaving the Pier 30-32 site are located Harrison and Bryant Streets within 6-8 blocks of the Pier.

The parking demand would be greater at a Pier 30-32 site due to the lack of linked tourist trips and fewer transit alternatives. There are some surface parking lots in the vicinity of Pier 30-32 which are used during the week by office workers and could potentially accommodate the project on weekends through shared parking programs. However, on weekdays there is little available parking in the area which could absorb the project parking demand. The project's weekday parking impact on the area with a Pier 30-32 site would be greater than that of the proposed project at a Pier 39 site.

Pier 30-32 is not well-served by existing transit services. Local transit (MUNI) is limited to the 32-Embarcadero, which passes in front of Pier 30-32 with 12- to 15-minute headways during the week and 20-minute headways on weekends. Two other MUNI routes pass close to the site (the 80X-Gateway Express and 81X-Caltrain Express), but are express commuter lines which operate during weekday peak periods only. Based on the tourist/visitor nature of the proposed project traffic, it could not be expected that any significant portion of the project travel demand could be served with existing service at the Pier 30-32 alternative site. Comparatively, the proposed Pier 39 project site is served by several transit services. This includes eight bus routes either terminating in or passing through the Northern Waterfront area with five providing access to Pier 39 (32, 19, 15, 42, and 30). The Powell Street-Mason Street cable car line terminates six blocks from the project site. There is also ferry terminal service to and from Marin County from Pier 43½, within walking distance of Pier 39.

The Montgomery and Embarcadero BART stations are both located within eight blocks of Pier 30-32. An Underwater World shuttle between Pier 30-32 and the BART stations could increase the site's transit accessibility. Ultimately, the extension of MUNI Metro service to the south of Market area could provide viable transit accessibility to the project. While this transit service would be effective in servicing local residents, the bulk of the tourist/visitor patrons would still be more inclined to use autos since basic public transit does not add to the tourist experience (as compared to cable cars or historic streetcars which would access the Pier 39 site). Current total transit share would be

approximately 2-3 percent of all visitors, or about 400 new person trips per day at the Pier 30-32 alternative site as compared to 15 percent of all visitors or 750 new transit person trips per day for the proposed project at the Pier 39 site. If Muni Metro Service is extended to the South of Market area, the percentage of public transit patronage would increase.

4. Other Issues

The increased travel demand associated with this alternative could result in increased impacts on vehicular-related air quality and noise impacts in the vicinity of the alternative site.

Impacts relating to air quality, water quality and marine biology, and geology/topography would be similar to those impacts related to the proposed project.

Impacts relating to construction noise could be greater or less than the proposed project depending on the number of new piles that would be needed to support the heavy loads of the aquarium tank.

Because this alternative project would introduce a commercial recreation use into an area which was traditionally maritime/industrial in use, there exists potential for growth inducement impacts greater than those described for the proposed project. This alternative, if successful, could, in conjunction with other commercial recreation development, result in a major change in overall land use patterns along the waterfront in the North China Basin Area.

REASON FOR REJECTION

The project sponsor has rejected this alternative because it would not meet their objectives as outlined in Chapter II. The project sponsor feels that the site is remote from other tourist-related areas in the city. Although the pier location would be aptly suited for a water oriented use of this type, the project sponsor believes that the surrounding mix of maritime, residential and recreational uses would not be conducive to the success of commercial recreation of this type. The project sponsor also believes that there is a lack of transit facilities necessary to support the project.

C. ALTERNATIVE THREE: ENTIRE PROJECT ON EXISTING PIER 39

DESCRIPTION

Under this alternative, the project would be constructed on the existing apron of Pier 39 and would not extend the existing Pier 39 into the existing marina (see Figure 36, page 164). The service road around Pier 39 would not change and the sixteen boat slips in the Pier 39 marina, to be removed with the proposed project, would not be demolished. Approximately 25,400 square feet of existing building footprint would be demolished (compared to the 3,600 square feet that would be demolished with the proposed project). Under this alternative, up to 40,000 square feet of existing retail use would be removed, possibly including the theatre on the second floor of Pier 39 adjacent to the proposed aquarium site, as compared to the proposed project plan which would result in the removal of approximately 3,600 sq.ft. of existing space.

The design would be more condensed, resulting in the possible deletion of some of the facilities associated with the proposed project such as the upper level terrace and the educational function room. Access to the proposed project would be from the west side of the project site, near the entrance to the existing arcade and stairway to the "San Francisco Experience" theatre. The design of the large tank, tide pool, gift shop and exhibit area would remain unchanged in this alternative.

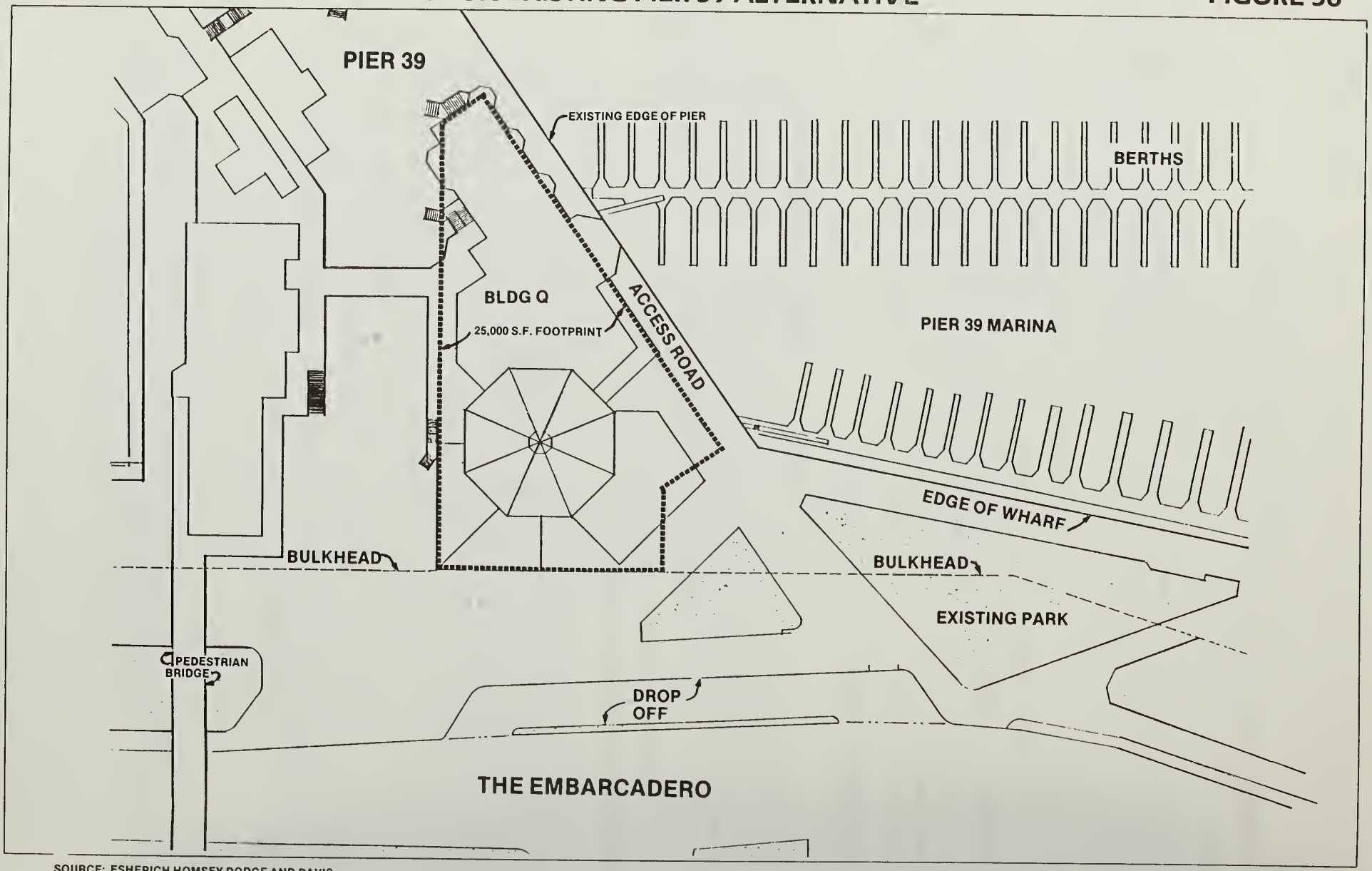
Because Pier 39 was not designed to accommodate the heavy, concentrated horizontal and vertical load of the tanks, additional piles would need to be added to the existing pier structure. A new type of pile would have to be used which would have greater reinforcement characteristics to withstand the heavy weight of the large aquarium tanks. Under the project site approximately 220 piles would have to be removed (22,000 square feet of the existing pier) and the pier deck under the site, which consists of a 5-inch base of concrete and wood beams and girders, would also have to be removed. After demolition, approximately 114 new 1-1/2 to 4-foot diameter piles would be driven along with a 36-inch concrete base slab constructed over top.

IMPACT

Under this alternative, approximately 25,400 square feet of existing occupied building space would be replaced, causing disruption to existing businesses, as compared to

NO NEW FILL/ENTIRE PROJECT ON EXISTING PIER 39 ALTERNATIVE

FIGURE 36



SOURCE: ESHERICH HOMSEY DODGE AND DAVIS

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replacement of 3,500 sq.ft. with the proposed project. The land uses on Pier 39 would continue to be a mixture of retail and commercial recreation, the same as with the proposed project.

Although the massing of the building in this alternative could be larger, the impact on urban design and visual quality could be less, as the aquarium would not extend south into the marina and block Bay views from the Northern Waterfront Park and the Embarcadero which are currently available, as compared to the additional view blockage described for the proposed project.

During construction, there would be greater impacts on air quality and noise due to greater amounts of demolition. Because portions of Pier 39 would have to be structurally upgraded to support the increased load factors due to the aquarium, noise impacts associated with pile-driving would also occur, similar to those described for the proposed project.

Pedestrian access and circulation would be more congested at the southern end of Pier 39 as access to and from the project would be on the western side of the project site, in the main entry-way to the entire Pier 39 development.

Because existing buildings on Pier 39 would be demolished (approximately 25,000 square feet), there would be a decrease in retail space on the project site. As a result, the net new trip generation from the project would decrease, but impacts relating to intersection level of service, V/C ratios, vehicular-related air quality emissions and noise would not be noticeably different from those described for the proposed project. Parking demand and pedestrian activity would also be essentially the same as that described for the proposed project.

Construction impacts relating to water quality and marine biology would be greater under this alternative than under the proposed project because about 200 piles would have to be removed from Pier 39 before installing about 114 new piles. This would cause more turbidity in the water surrounding the pier as compared to the proposed project.

Impacts relating to growth inducement would remain unchanged as compared to the proposed project.

REASONS FOR REJECTION

The Project Sponsor has rejected this alternative for the following reasons: (1) the structure at Pier 39 will not support the loads required for the proposed aquarium tank; (2) all existing space on Pier 39 is either fully leased to retail businesses or committed to circulation, public access and public open spaces; (3) location on the existing pier would cause overcrowding at the entry to Pier 39 and of available public open space; and (4) relocation to avoid any new fill would require demolition of the octagon building which serves as an entry to Pier 39. The Sponsor also believes that this alternative would not result in any significant environmental benefits which would outweigh the negative impacts of the proposed alternative and would, in fact, involve adverse environmental effects.

D. ALTERNATIVE FOUR: NON-WATERFRONT LOCATION

DESCRIPTION

Under Alternative Four, the proposed project would be constructed on Seawall Lot 314 which is bounded by Bay and Kearny Streets and the Embarcadero. This lot is approximately 38,000 gross square feet and currently contains a gas station, automatic car wash and a parking lot, all of which would be displaced. This alternative would include the same characteristics as the proposed Underwater World project including the exhibit area, gift shop,and the aquarium. The project site would utilize the entire 38,000 square foot site for the aquarium building, promenade and entrance (compared to the 25,400 square feet for the proposed project) would be of similar functional design and include the same facilities as the proposed project.

The site of this alternative is entirely on existing fill. There would be no need for additional fill and piles to support the building (the proposed project has approximately 114 piles).

IMPACTS

Impacts relating to air quality, zoning, and growth inducement would be approximately the same as the proposed project.

Under this alternative, there would be no changes to the project site as it now exists. The Pier 39 amusement facility would remain the same, and the service road and the sixteen boat slips in the Pier 39 Marina (which would be removed with the proposed project) would remain unchanged.

Impacts relating to land use would be greater than the proposed project as the Chevron gas station, parking lot (for approximately 20 cars) and the automatic car wash would be removed. The alternative project site would still be part of Northern Waterfront and within the jurisdiction of the San Francisco Port and the San Francisco Bay Conservation and Development Commission (BCDC).

The alternative project site would be on the south side of the Embarcadero and surrounded by buildings to the west and south that are three and four stories tall. The transition to the two-story aquarium structure could be minimized with compatible design features. Existing views from the Northern Waterfront Park along the waterfront and Pier 39 Marina would remain unchanged.

The same number of visitors attracted to the alternative project would be expected to be about the same as the proposed project. Transportation impacts associated with parking, volume/capacity flows, vehicular-related air quality emissions, and vehicular-related noise would therefore be approximately the same. However, pedestrian circulation patterns would change. Pedestrians approaching the alternative site from other waterfront attractions or visiting other attractions after attending the alternative aquarium site would need to cross the Embarcadero. A signalized pedestrian crossing is available immediately north of the Embarcadero/Beach intersection. Pedestrian use of this intersection would increase under this alternative.

There would be no need for additional fill under this alternative. There would be no construction impacts to marine environment such as water turbidity and unsettling of

benthic organisms living on the Bay floor. The water usage during operation would have the same effects as the proposed project. An average of 160 gallons per minute would be needed for the recirculating filtration system, and 20,000 gallons per day would be needed for the filter backwash discharge system. Since the project site would not be located on the waterfront, an additional pipe system would be needed to transfer the water to and from the site. It would be expected that Bay water would be extracted and discharged from a site close to the currently proposed project site. Therefore, the effect from extraction and discharge of seawater would be the same as the proposed project.

Since no piles would be driven, the potential changes to geology and topography would be less than the proposed project. The effects of construction noise would be less than the proposed project as there would be no pile driving. Operational noise from additional pumps necessary to transfer water from the Bay could result in a greater noise impact than the proposed project.

REASON FOR REJECTION

The Project Sponsor has rejected this alternative for the following reasons: (1) such a location would create an undesirable isolation of the aquarium from other visitor attractions and make pedestrian access more difficult; (2) the location would detract from the desired marine environment which is a primary feature of the proposed project; (3) visitors would not have access to the water's edge, resulting in undesirable restrictions on planned educational programs; (4) it would be necessary to transport water from the Bay across or under The Embarcadero, creating an additional cost and burden (if permitted at all); (5) the Project Sponsor has no interest in or control over the alternative site; (6) it would be necessary to displace an existing use; and (7) such a location would be more distant from available parking at the Pier 39 garage and at other parking facilities at Fisherman's Wharf.

---

[1] Randy Rossi, San Francisco Port District, telephone conversation, April 14, 1988.

[2] San Francisco Bay Conservation and Development Commission, San Francisco Waterfront, Special Area Plan, Amended April, 1975.

[3] City and County of San Francisco Municipal Code, Planning Code.

[4]Op. cit., Northeastern Waterfront Plan, page 45.

[5]Op. cit., Northeastern Waterfront Plan, page 11.

[6]Op. cit., Special Area Plan, page 26.

[7]For a description of traffic conditions in this area, see the Rincon Hill Plan EIR, City and County of San Francisco, 82.39E, certified June 27, 1985.

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APPENDICES

APPENDIX A

INITIAL STUDY

APPENDIX A

UNDERWATER WORLD AQUARIUM

INITIAL STUDY

January 29, 1988

1. PROJECT DESCRIPTION

The proposed project would be an aquarium and educational facility built on piles over the Bay in the Pier 39 marina and attached to the existing Pier 39 development, which consists of approximately 196,000 sq.ft. of small scale retail and restaurant uses, a waterfront park and a 1,000-car garage. The proposed aquarium site is located east of Fisherman's Wharf, fronting on The Embarcadero (see Figure 1, page 2 [page A-4 of this document]).

Approximately 22,000 square feet of the 39,600 square foot building site currently contains a video game parlor and bumper car facility, part of the existing Pier 39 development. The remainder of the building site (17,600 square feet) would be constructed on new piles in the Pier 39 marina. Part of the amusement facility and the bumper cars would be removed as would about sixteen boat slips in the marina. Pier 39 would continue to be occupied by small scale retail and restaurant uses.

The proposed aquarium would contain a total of 37,000 gross square feet (gsf) of floor area as defined by the City Planning Code, including 7,500 gsf of lobby/public circulation space, 2,000 gsf of retail gift shop space, exhibit area of 2,500 gsf and an 8,400 gsf aquarium tank (see Figures 2, 3, 4 and 5, pages 3, 4, 5 and 6 [pages A-5, A-6, A-7 and A-8 of this document]). There would be about 4,500 gsf of service area and 12,100 gsf of general public ancillary space (toilets, mechanical, etc.).

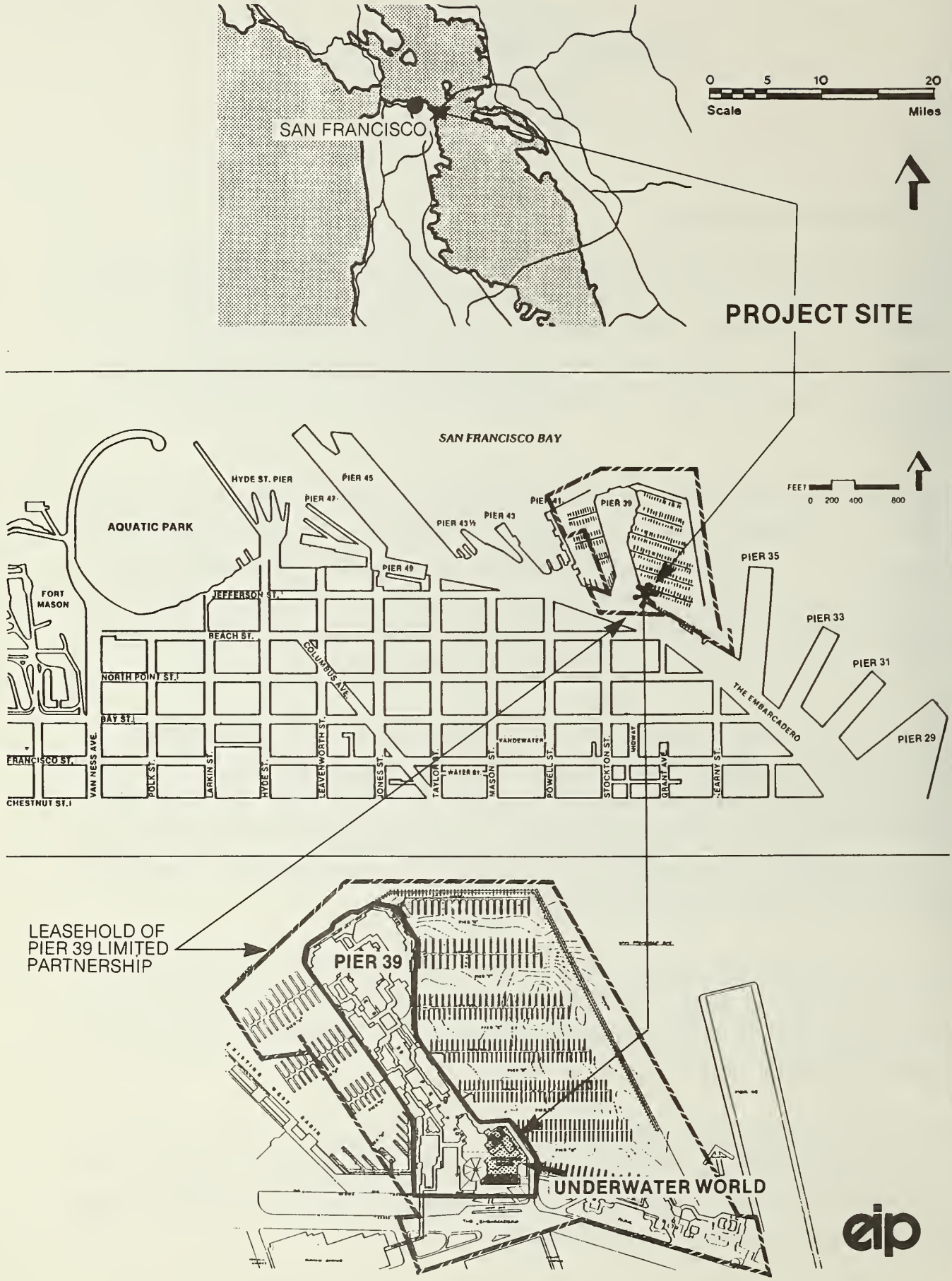
The main entrance to the aquarium would be from The Embarcadero, in front of Pier 39 but outside the main entrance to the pier. Visitors would enter the facility and pass through an educational exhibit (a tide pool display) prior to entering the aquarium tank. Visitors would exit at the main entrance.

The project would not involve the construction of new parking spaces. There would be an off-street pedestrian drop-off zone for vehicles and buses in front of the aquarium. This drop-off zone would also serve visitors to the remainder of Pier 39 and other Northern Waterfront attractions, parks and promenades.

SITE LOCATION MAP

FIGURE 1

SOURCE: EIP ASSOCIATES



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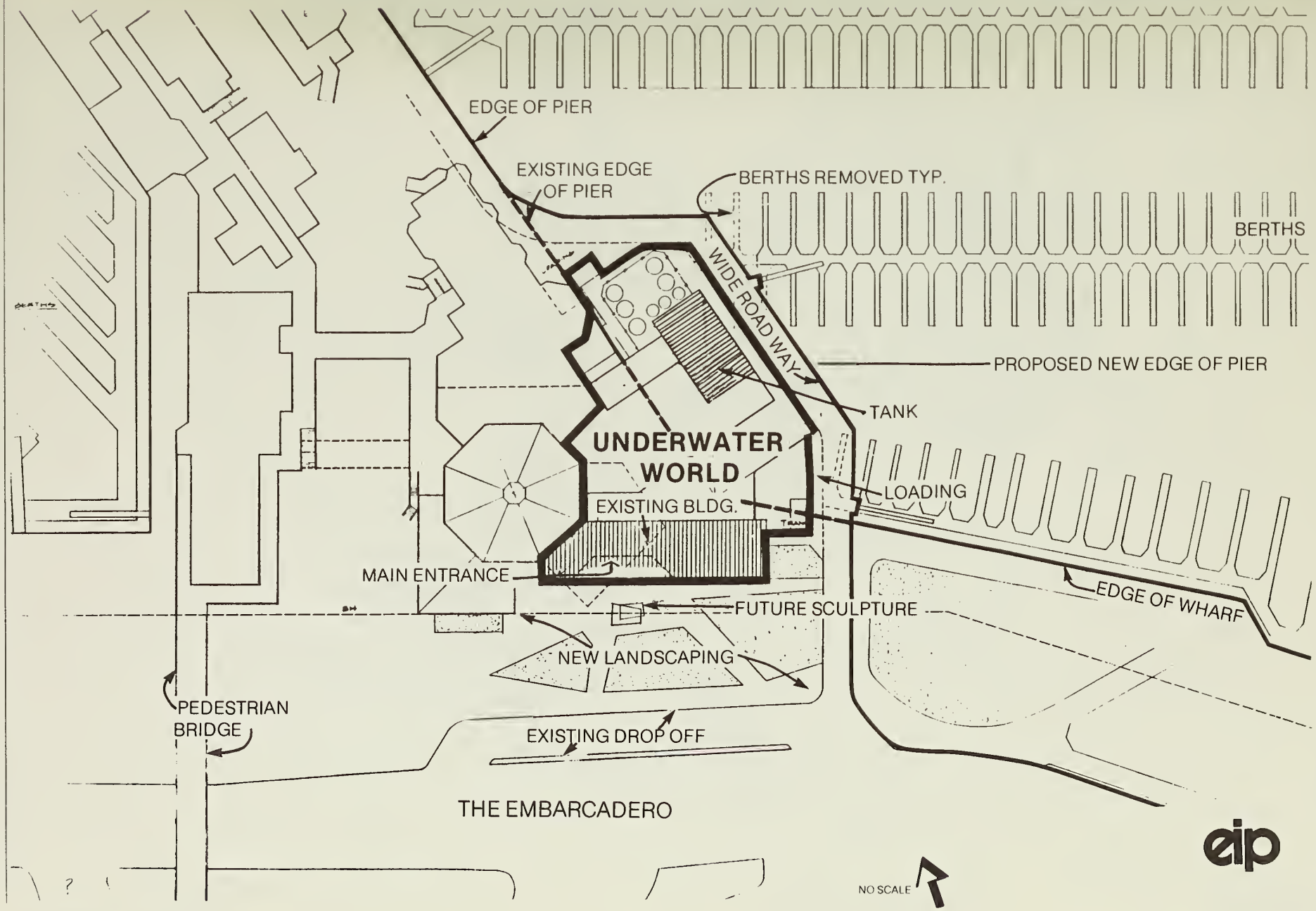
SITE PLAN

FIGURE 2

SOURCE ESHERICK HOMSEY DODGE AND DIAVIS



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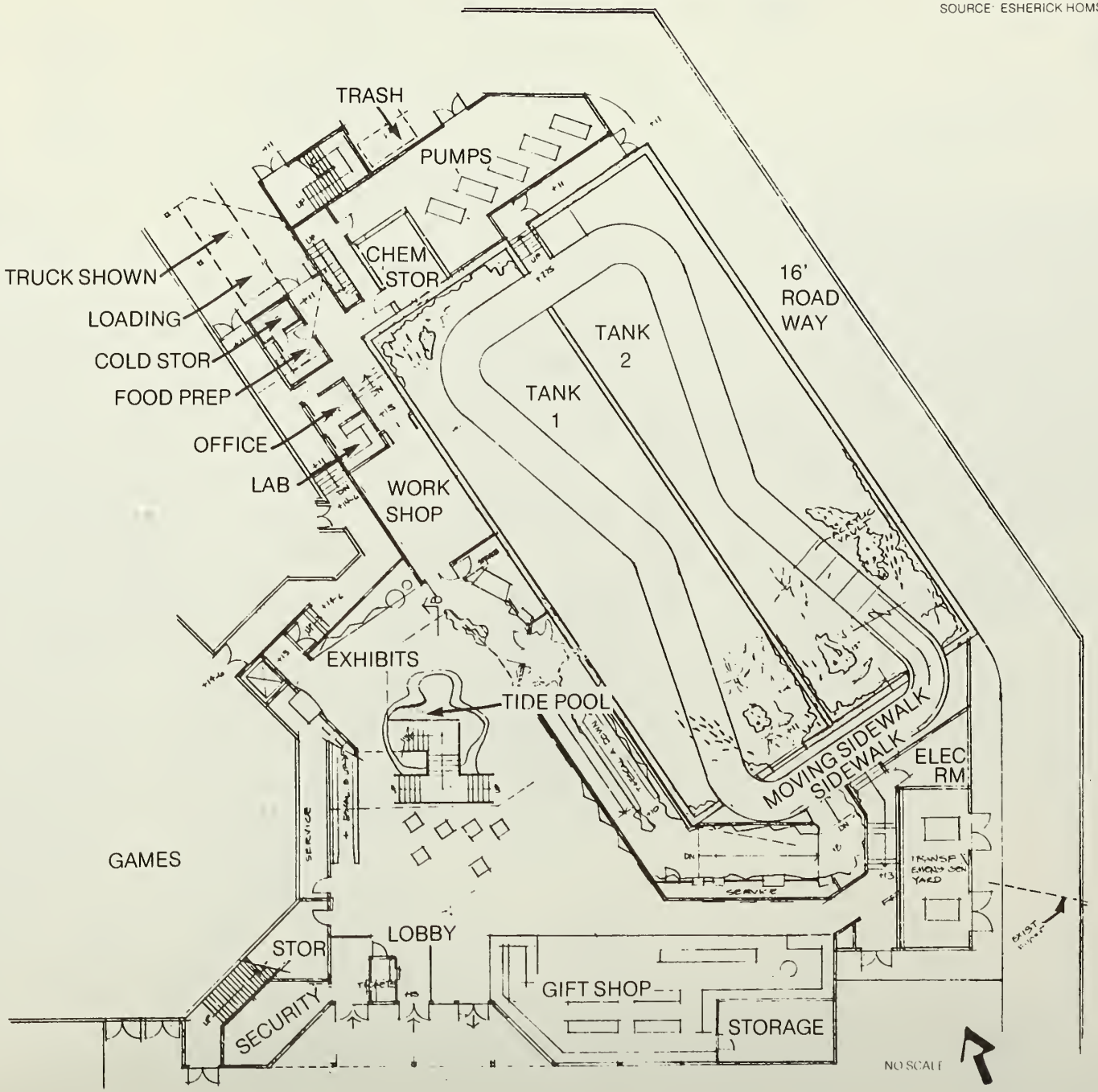
FIRST FLOOR

FIGURE 3

SOURCE: ESHERICK HOMSEY DODGE AND DIAVIS



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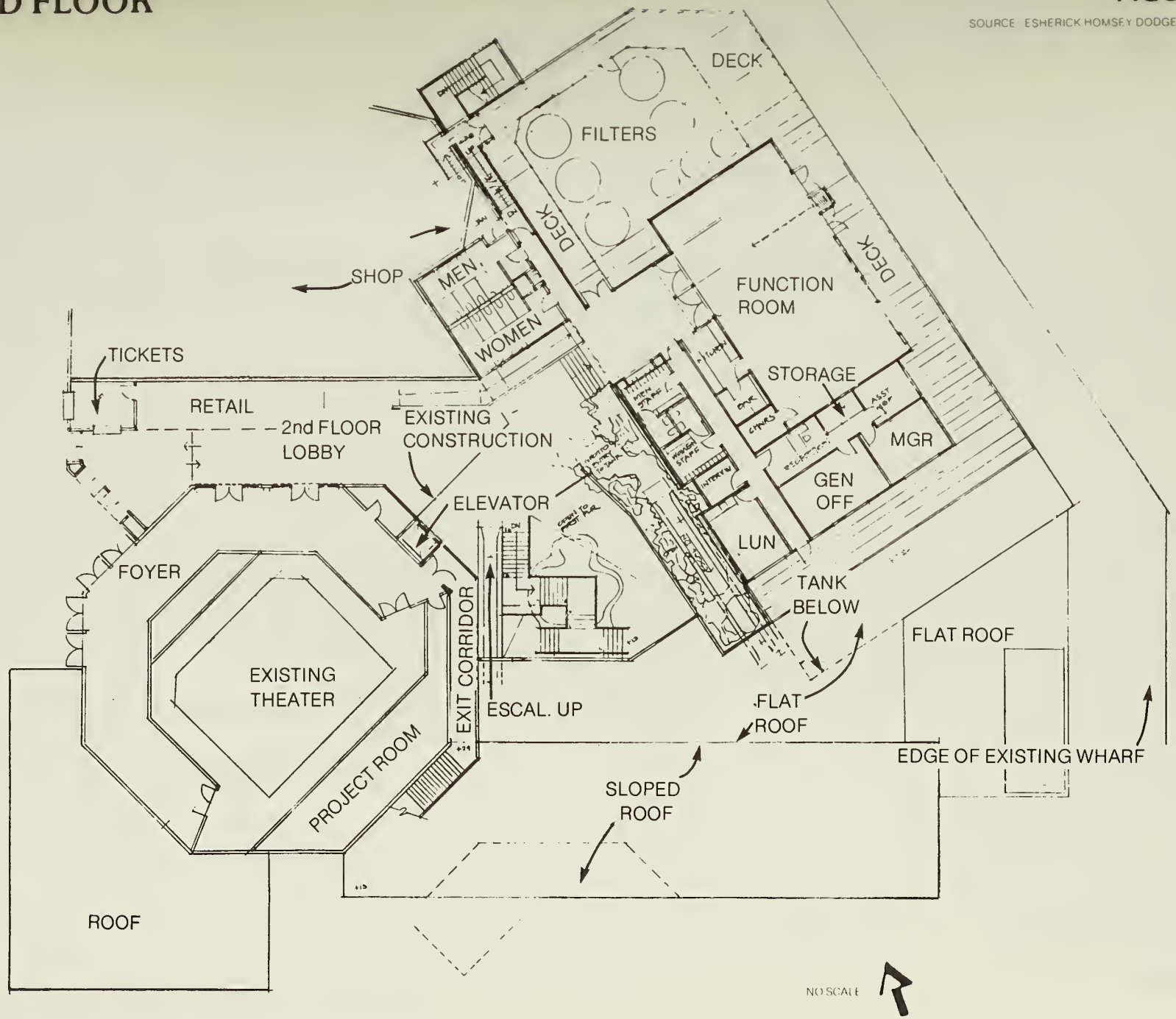
SECOND FLOOR

FIGURE 4

SOURCE ESHERICK HOMSEY DODGE AND DIAVIS



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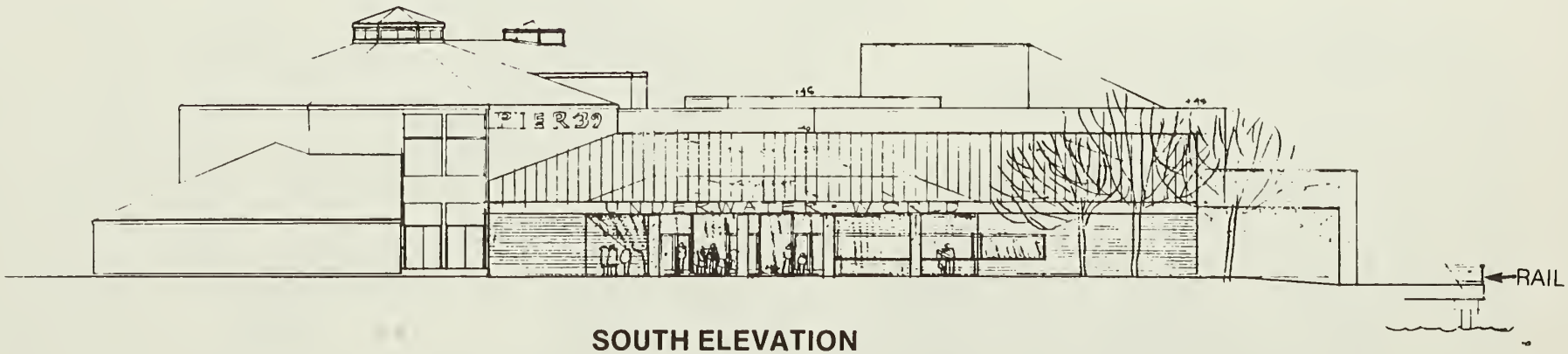
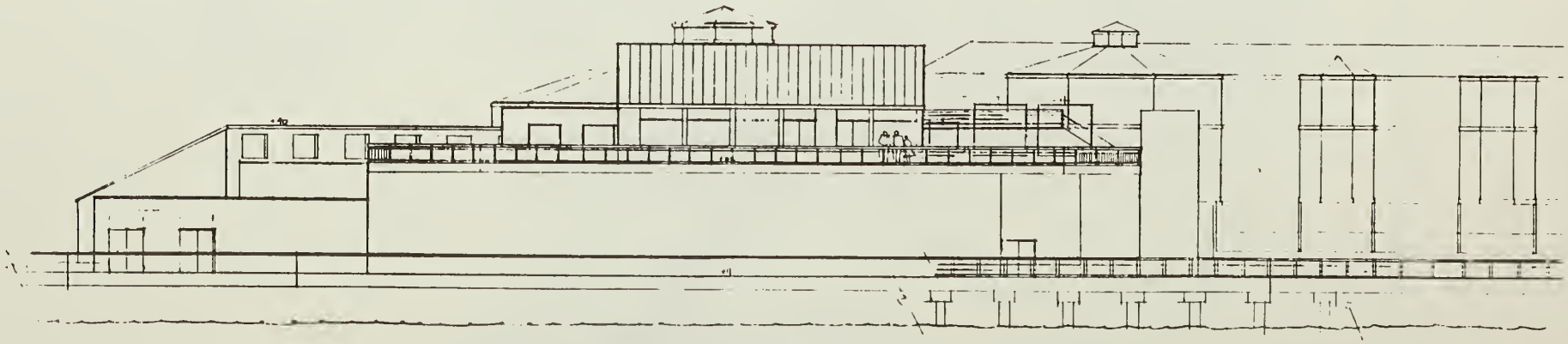
SOUTH AND EAST ELEVATIONS

FIGURE 5

SOURCE: ESHERICK HOMSEY DODGE AND DIAVIS



SOUTH ELEVATION



EAST ELEVATION

NO SCALE

eip

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The aquarium tank would contain approximately 750,000 gallons of salt water drawn from the Bay and filtered through a set of pressure filtration tanks. The circulation system would be cold-water (at Bay temperature) and semi-closed. A semi-closed system allows the aquarium water to be gradually released and replaced while being continuously circulated and filtered. A moveable walkway would carry visitors through an acrylic tunnel passing through the interior of the aquarium tank. The aquarium would contain approximately 2,000 fish which are indigenous to the Bay Area and Northern California.

The first story of the proposed project would contain approximately 22,000 gsf of area including the lobby, main tanks, gift shop, tidal pool, and mechanical rooms. A partial mezzanine would contain 2,000 gsf. The second story of the project would contain approximately 10,000 gsf of administrative offices, a function room (for education groups, post conference groups, etc.), public spaces and staff spaces. An area of 3,000 gsf would be provided on the roof for mechanical use.

The platform of Pier 39 would be extended to the east and would contain about 17,600 gsf for the proposed building and new deck. Continued access would be provided to the public and emergency vehicles around the entire Pier 39 development from The Embarcadero.

The project sponsors anticipate completion of the project design by mid-1988. Construction would commence once permits were issued. The project would take approximately 14 months to construct and three months to prepare the fish tank for occupants. The uncompleted portion of the northern waterfront park improvements by Pier 39, along the Embarcadero east of Pier 39 (which was required as a condition of approval of the construction of recent Pier 39 improvements), would be used as a staging area for the project. Once the proposed project is completed, the entire park would be constructed. The project sponsors estimate construction costs of $12,000,000. The project sponsors are the Pier 39 Limited Partnership, ERA Equities of San Francisco, and Questar Corporation of Auckland, New Zealand. The project architects are Esherick, Homsey, Dodge and Davis.

The project would require permits from the Bay Conservation and Development Commission, the U.S. Army Corps of Engineers and the Port of San Francisco in addition to an amendment to the previous Pier 39 Conditional Use Authorization from the City Planning Commission (CPC Resolution 7551). A permit from the Regional Water Quality Control Board might be required.

2. SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

A. EFFECTS FOUND TO BE POTENTIALLY SIGNIFICANT

The proposed Underwater World project is examined in this Initial Study to identify potential effects on the environment. Some of the effects that would be generated by the proposed project, either on a project-specific basis or cumulatively, have been determined to be potentially significant and will be analyzed in an Environmental Impact Report. Other impacts would not be significant, but will be included in the EIR for informational purposes. The EIR will cover land use and zoning including bay fill; relationship of the proposed buildings to the adopted environmental plans and goals; visual quality; transportation; construction noise; air quality - project operation and traffic; water quality/marine biology; and geology/topography

B. EFFECTS FOUND NOT TO BE SIGNIFICANT

The following environmental effects would either be insignificant or mitigated to insignificant levels by measures incorporated into the project design. These require no further environmental analysis and will not be addressed in the EIR.

Light and Glare. The proposed project would not generate any light or glare impacts on other properties.

Population. The proposed project would not displace large numbers of employees or any residents, and would not create a significant demand for housing.

Operational Noise. The proposed project would not be affected by ambient noise levels due to the inclusion of noise insulation features in the project designs. Project operation, including traffic generated by the project, would not significantly increase the ambient noise levels in the project vicinity.

Construction-Generated Air Quality. Construction activities may cause a temporary increase in localized particulate levels; a measure to reduce emissions generated during construction activities is included in the proposed project.

Odors. Construction of the proposed project would not create objectionable odors or involve burning of any materials.

Shadows. The proposed project would not generate significant shadow impacts on streets and sidewalks around the site. At no time would the proposed project cast any shadow on an open space protected under Proposition K.

Wind. The proposed project would not generate significant wind impacts at pedestrian levels.

Utilities/Public Services. Increased demand for public services and utilities attributable to the proposed project would not require additional personnel or equipment and would be too small to make a noticeable contribution to cumulative service demands.

Endangered Species. The proposed project would not affect any rare or endangered species or habitats.

Water Supply. The proposed project would not affect a public water supply, nor would it affect ground water. The project would not result in flooding, erosion or siltation.

Energy. The proposed project would be constructed to conform with the energy requirements of Title 24. The project would not encourage activities that would result in the wasteful use of energy or have a substantial effect on a natural resource.

Hazards. The proposed project would not be affected by hazardous uses or health hazards in the area, nor would the proposed project create potential health hazards. Evacuation and emergency response plans would be developed by the project sponsor.

Cultural. The project would not result in the demolition of any historic structures and since it is being built over the Bay, would not involve excavation of any potential historic artifacts. An archaeological report was conducted for the project site in which it was determined that it is very unlikely that prehistoric remains would be disturbed during construction.

3. ENVIRONMENTAL SETTING

3.1 COMPATIBILITY WITH EXISTING ZONING

A. COMPATIBILITY WITH EXISTING ZONING AND PLANS

	Not Applicable	Discussed
1. Discuss any variances, special authorizations, or changes proposed to the City Planning Code or Zoning Map, if applicable.	____	X
*2. Discuss any conflicts with any adopted environmental plans and goals of the City or Region, if applicable.	____	X

Zoning

The proposed project is located in the C-2 (Community Business) District. The site is also in the Northern Waterfront Special Use District No. 1. This Special Use District was created by the City to protect the unique maritime character of the area and to promote operations related to water-borne commerce or navigation as the principal uses in the area. Because the project is not directly related to the conduct of waterborne commerce or navigation, it would require an amendment of Pier 39's Conditional Use authorization by the City Planning Commission (Section 240 of the City Planning Code). A public aquarium would be permitted in the C-2 District under Section 221 of the City Planning Code (Assembly and Entertainment Uses).

The floor area ratio (FAR) for the C-2 District is 3.6:1. However, the Northern Waterfront Special Use District No. 1 permits a higher maximum FAR of 5.0:1. The project would have an FAR of 0.93:1, less than the maximum allowable 5.0:1. The project site is located in a 40-X Height and Bulk District, where the allowable building height is 40 feet and there are no bulk requirements unless the average slope of the site is greater than 5%. The average slope is less than five percent for the project site. The project would rise to 40 feet above the street and would comply with all of the requirements of the 40-X Height and Bulk District. For this project, Section 151 of the City Planning Code would require provision of 74 parking spaces. The City Planning Commission will consider parking adequacy when it considers the proposed amendment of Pier 39's Conditional Use Authorization.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Under Section 152 of the City Planning Code, one freight loading space would be required for this project. One freight loading space, which meets the minimum required dimensions under Section 154, would be provided.

Relationship to the Master Plan and Other Planning Documents

The relationship of the proposed project to the policies of the Master Plan, and other adopted environmental plans and goals will be analyzed in the EIR.

3.2 ENVIRONMENTAL EFFECTS

LAND USE

	Yes	No	Discussed
1. Land Use. Could the project:			
*a. Disrupt or divide the physical arrangement of an established community?	___	X	X
b. Have any substantial impact upon the existing character of the vicinity?	___	X	X

The proposed project site is located in San Francisco in the Northern Waterfront District near Fisherman's Wharf. This area has been dominated in the recent past by a combination of maritime-oriented commercial uses such as fish processing and other uses serving the San Francisco commercial fishing fleet, primarily on Piers 41 through 45 and the Hyde Street pier, and tourist-serving uses, including hotels, specialty retail complexes (i.e. Pier 39) and entertainment establishments. To the southeast of the project site, in the Base of Telegraph Hill area, there has been development of higher-intensity office and residential uses compared to previous development in recent years.

Uses within two to three blocks of the proposed aquarium site consist mainly of the Pier 39 specialty retail complex, parking lots and garages, hotel and residential buildings, and other Pier buildings. The Pier 39 parking garage is located across the Embarcadero. Directly to the north, in the Bay, is the Pier 39 marina with slips for 360 boats.

The proposed aquarium site is currently occupied by a portion of the Pier 39 complex and a portion of the Pier 39 marina. The remainder of Pier 39 is occupied by the Pier 39

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

complex. The existing character of the vicinity of the project would not change in type of development but would experience an increased intensity of development.

Although the aquarium would be the first of its type in the project area, it would represent continued commercial activity on the project site and in the project area. The project would not disrupt or divide the physical arrangement of the existing community. The project would involve the creation of new Bay fill, as defined by the Bay Conservation and Development Commission (BCDC). BCDC will provide input as to the significance of this impact on the Bay. These issues will be discussed in the EIR.

	Yes	No	Discussed
2. Visual Quality. Could the project:			
*a. Have a substantial, demonstrable negative aesthetic effect?	___	X	X
b. Substantially degrade or obstruct any scenic view or vista now observed from public areas?	X	___	X
c. Generate obtrusive light or glare substantially impacting other properties?	___	X	X

The proposed project would be similar in height to the existing Pier 39 development, but would represent an increase in height on the project site. The project would result in a loss of open area on the undeveloped portion of the site. The bulk of the project would be similar to that of the rest of Pier 39, but would be smaller than other recently-built retail and office structures to the south and east.

The proposed project would block some views of the Bay from the Embarcadero and from sidewalks along Grant and Beach Streets. The project would not block any other views of the Bay or other points of interest from public open space areas. Since the proposed project would not be higher than some of the existing development in the project area, it would not become a visible part of the City skyline. These issues will be further analyzed in the EIR.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The proposed project would not include any reflective glass and would not cause any glare impacts on nearby pedestrians or autos. See Mitigation Measures, page 25 [page A-29]. This issue will not be discussed further in the EIR.

	Yes	No	Discussed
3. Population. Could the project:			
*a. Induce substantial growth or concentration of population?	___	X	X
*b. Displace a large number of people (involving either housing or employment)?	___	X	X
c. Create a substantial demand for additional housing in San Francisco, or substantially reduce the housing supply?	___	X	X

The proposed project would not result in a reduction in the number of employees in the existing amusement facility at Pier 39.[1] It is estimated that the proposed project would generate employment for approximately 45 workers, primarily in commercial service, aquarium maintenance and building maintenance. The maximum potential patronage of the aquarium would be 8,000 persons per day, or 800 persons per hour. Since many jobs at the proposed project would provide employment for semi- and unskilled workers with low to moderate incomes, including minorities, most of the new jobs would be expected to be held by current San Francisco residents who are either unemployed or underemployed. The project would thus not be expected to attract new residents to San Francisco or generate new housing demand. These issues will not be discussed further in the EIR.

[1] Joe Smith, Pier 39, telephone conversation, 9/16/87.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

4. Transportation/Circulation. Could the project:	Yes	No	Discussed
*a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system?	X		
b. Interfere with existing transportation systems, causing substantial alterations to circulation patterns or major traffic hazards?		X	
c. Cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity?	X		
d. Cause a substantial increase in parking demand which cannot be accommodated by existing parking facilities?	X		

A transportation study is being conducted for the project. Issues being examined include traffic, transit, parking and pedestrian impact resulting from the project and from cumulative development in the Northern Waterfront area. These issues will be analyzed in the EIR.

5. Noise. Could the project:	Yes	No	Discussed
*a. Increase substantially the ambient noise levels for adjoining areas?		X	X
b. Violate Title 24 Noise Insulation Standards if applicable?		X	X
c. Be substantially impacted by existing noise levels?		X	X

Project Operation

The noise environment of the site, like downtown San Francisco, is dominated by vehicular traffic noise. The Environmental Protection Element of the Master Plan indicates a day-night average noise level of 70 dBA in 1974, along the Embarcadero, adjacent to the project site and along North Point Street.[1] The nearest residences are approximately 800 feet south of the site on the south side of North Point Street.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The Environmental Protection Element of the Master Plan contains guidelines for determining the compatibility of various land uses with different noise environments. For commercial uses, the guidelines recommend an analysis of noise reduction requirements and inclusion of noise insulation features where there is an exterior noise environment above an Ldn of 70 dBA. The proposed structure would not include housing, so Title 24 Noise Standards would not be applicable.

The project's operation would not result in perceptibly greater traffic-related noise levels than those existing in the area. To produce a noticeable increase in environmental noise, a doubling of existing traffic volume would be required; traffic increases of this magnitude would not occur with anticipated cumulative development including the project.[2]

The project would be required to comply with the San Francisco Noise Ordinance, San Francisco Police Code Section 2909, "Fixed Source Noise Levels," which regulates mechanical equipment noise. The project site and the surrounding area is within a C-2 district. In this district, the ordinance limits equipment noise levels at the property line to 70 dBA between the hours of 7 a.m. and 10 p.m. and to 60 dBA between the hours of 10 p.m. and 7 a.m. Noise generating equipment on the project site would include two small ozone generators and two water pumps totaling 75 horsepower. During lulls in traffic, mechanical equipment generating 67 dBA could dominate the noise environment at the site. Because all mechanical equipment would operate day and night, the project engineer and architect would be required to include design features in the building to limit mechanical equipment noise levels to 60 dBA to meet the nighttime limit. Such noise levels would not result in a significant environmental impact. Discussion of operational and transportation-related noise will not be included in the EIR.

Construction Noise

Impacts of construction noise will be analyzed in the EIR.

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[1] dBA is a measure of sound in units of decibels (dB). The "A" denotes the A-weighted scale, which simulates the response of the human ear to various sound frequencies.

Ldn, the day-night average noise level, is a noise measurement based on human reaction to cumulative noise exposure over a 24-hour period, taking into account the greater annoyance of nighttime noises; noise between 10 p.m. and 7 a.m. is weighted 10 dBA higher than daytime noise.

[2]See San Francisco Department of City Planning Downtown Plan EIR (EE81.3), certified October 18, 1984, Vol. 1, Section IV.E. generally and Section IV.J., pp. IV.J.8-18, Increases of 1 dBA or less in environmental noise are not noticeable by most people outside a laboratory situation (National Academy of Sciences, Highway Research Board, Research Report No. 117 (1971)). (See also FHWA Highway Traffic Noise Prediction Model underlines, Report #FHWA-RD-77-108, December 1978, p. 8, regarding doubling of traffic volumes producing increases of 3 dBA or more, which are noticed by most people.)

	Yes	No	Discussed
6. Air Quality/Climate. Could the project:			
*a. Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation?	X		X
*b. Expose sensitive receptors to substantial pollutant concentrations?		X	X
c. Permeate its vicinity with objectionable odors?		X	X
d. Alter wind, moisture or temperature (including sun shading effects) so as to substantially affect public areas, or change the climate either in the community or region?		X	X

Two types of air quality impacts could be expected from the proposed project: long-term impacts related to use and operation, and short-term impacts from construction activity. Project-related and cumulative traffic may contribute to air pollution near the project sites and will be analyzed in the EIR.

Construction activities would temporarily affect local air quality. Particulates are generally the major source of construction air emissions. Demolition and construction activities would not involve burning of any materials and would not create objectionable odor. The construction of the project would not result in excavation or other soil disturbance with corresponding particulate generation. There will be no further discussion of construction-related air quality impacts in the EIR. A Mitigation Measure is included, see page 25 [page A-29].

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The Sunlight access ordinance, Proposition K, is intended to protect sunlight on designated open spaces throughout San Francisco from one hour after sunrise to one hour before sunset. The closest park to the proposed project is the Chestnut/Kearny mini park which is approximately 1,250 feet to the south. The difference in height between ground level at the mini park and ground level adjacent to the proposed building is 20 feet. The longest shadow that would be cast by the proposed building during hours governed by Proposition K would occur on December 21 at 8:22 a.m. when the proposed project would cast a shadow of approximately 350 feet to the northwest. At no time would the proposed project cast any shadow on an open space protected under Proposition K. The proposed project would not increase wind accelerations in the project vicinity. These topics will not be discussed in the EIR.

	Yes	No	Discussed
7. Utilities/Public Services. Could the project:			
*a. Breach published national, state or local standards relating to solid waste or litter control?	___	X	___
*b. Extend a sewer trunk line with capacity to serve new development?	___	X	X
c. Substantially increase demand for schools, recreation or other public facilities?	___	X	___
d. Require major expansion of power, water, or communications facilities?	___	X	X

The proposed project would contribute to the cumulative demand for community services citywide. Cumulative impacts upon solid waste and waste water service providers have been analyzed in the Downtown Plan EIR and no significant impacts have been identified. The Downtown Plan EIR setting and impacts discussion for solid waste and waste water (Vol. 1, IV.F.1-2 & IV.F.8-10; Vol. 2, pp. A-7 & K.1-2; Vol. 3, pp. C&R F.1-4), is summarized below and incorporated by reference herein. Updated information on solid waste disposal is also include.

San Francisco's solid waste is currently disposed of at the Altamont Hills landfill under a contract which expires in 1988. The City recently entered into a contract with the Alameda County Solid Waste Management Authority and the Oakland Scavenger Company

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

to dispose of 15 million tons of solid waste at the Altamont Hills landfill beginning when the present contract expires. This is expected to serve the City's needs until 2009.

A sewer system is being built pursuant to the City's Clean Water Program. The system is intended to handle combined volumes of sewage and rainwater runoff. Since the capacity of the system is designed to handle rainwater flows (which can be 50 times the volume of regular sewage) additional development citywide would not affect operation of the sewer system.

Providers of all utilities and services have been contacted and have indicated that existing capacities are adequate to serve the proposed project. Statements from utility and service providers are available for public review at the Department of City Planning, Office of Environmental Review, 450 McAllister Street, Sixth Floor. No further analysis is necessary in the EIR.

	Yes	No	Discussed
8. Biology. Could the project:			
*a. Substantially affect a rare or endangered species of animal or plant, or the habitat of the species?	___	X	X
*b. Substantially diminish habitat for fish, wildlife or plants, or interfere substantially with the movement of any resident or migratory fish or wildlife species?	X	___	X
c. Require removal of substantial numbers of mature, scenic trees?	___	X	X

The proposed project would discharge filtered aquarium water and backwash water into the Bay near the project site. Potential impacts on water quality and marine biology will be analyzed further in the EIR.

The project site is on Pier 39 and a portion of the Bay used for marina purposes. There are no rare or endangered species of plants or animals on the site. Street trees and other landscaping would be planted along the Embarcadero frontage of the site. No existing trees would be removed. The proposed project would not interfere with the movement of any resident or migratory birds. These issues will not be discussed further in the EIR.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

	Yes	No	Discussed
9. Geology/Topography. Could the project:			
*a. Expose people or structures to major geologic hazards (slides, subsidence, erosion and liquefaction)?	X		X
b. Change substantially the topography or any unique geologic or physical features of the site?		X	X

These issues will be discussed further in the EIR.

	Yes	No	Discussed
10. Water. Could the project:			
*a. Substantially degrade water quality, or contaminate a public water supply?	X		X
*b. Substantially degrade or deplete ground water resources, or interfere substantially with ground water recharge?		X	
*c. Cause substantial flooding, erosion or siltation?		X	

There is a permanent body of water partially covering the project site. The depth to water is approximately 10 feet below-grade, but varies with the Pacific tide. The site is also covered by paved roads and existing buildings. Run-off would continue to drain into the combined City storm/sewer system. The project would not affect ground water quality or the public water supply. The project would not result in additional flooding, erosion or siltation. There would be no dredging on the proposed site. These issues will not be discussed further in the EIR.

The project sponsor would be required to meet the water quality standards set by the Regional Water Quality Control Board for discharge into San Francisco Bay. The project impacts would be reviewed after the completion of the species list. The design of the aquarium outfall would include flow regulator or energy dissipation systems to prevent increased water turbidity. These issues related to water quality in the San Francisco Bay and effects on Bay marine life will be analyzed in the EIR.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

	Yes	No	Discussed
11. Energy/Natural Resources. Could the project:			
*a. Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	___	X	X
b. Have a substantial effect on the potential use, extraction, or depletion of a natural resource?	___	X	___

Annual energy consumption by the portion of Pier 39 to be removed has not been determined as separate metering for that section of the complex is not yet completed. Based on Title 24 maximum consumption, it is estimated that total annual energy consumption from the existing portion of the site is approximately 6 billion Btu.

Removal of the existing structure would require an unknown amount of energy. Fabrication and transportation of building materials, worker transportation, site development and building construction would require about eight billion Btu of gasoline, diesel fuel, natural gas and electricity.[1,2] Distributed over the estimated 50-year life of the project, this would be about 160 million Btu per year, or about 1.7% of annual building energy requirements.

New buildings in San Francisco are required to conform to energy conservation standards specified by Title 24 of the California Administrative Code. Documentation showing compliance with these standards is submitted with the application for the building permit and is enforced by the Bureau of Building Inspection.

Table 1, page 19 [page A-23 of this document], shows the estimated operational energy which would be used by the project. Project demand for electricity during PG&E's peak electrical load periods, July and August afternoons, would be about 200 kW, an estimated 0.0013% of PG&E's load of 16,000 MW.[3] Project demand for natural gas during PG&E's peak natural gas load periods, January mornings, would be 0.4 million Btu per day, or about .01% of PG&E's peak load of about 3.7 billion cubic feet per day.[4] Annual and peak daily electricity and natural gas consumption are shown in Figures 6 and 7, pages 20 and 21 [pages A-24 and A-25].

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

TABLE 1

ESTIMATED PROJECT ENERGY USE FOR PIER 39 UNDERWATER WORLD

	Excluding Pump Energy (as per Title 24)[1]	Including Pump Energy
Daily Natural Gas Consumption[2]		
Estimated natural gas consumption per sq.ft.	130 Btu[3,4,5]	130 Btu
Estimated peak daily natural gas consumption	40.5 therms	40.5 therms
Monthly Electric Consumption[2]		
Estimated electrical consumption per sq.ft.	0.81 kWh	4 kWh
Estimated total electrical consumption	24,800 kWh (254 million Btu)	123,600 kWh (1.3 billion Btu)
Annual Consumption		
Estimated total annual natural gas consumption	1,470 therms	1,470 therms
Estimated total annual electrical consumption	255,500 kWh (2.6 billion Btu)	1,418,600 kWh (14.5 billion Btu)
Connected kilowatt load	105 kw	345 kw
Estimated total annual energy consumption	3.1 billion Btu (180 barrels of oil)	14.6 billion Btu (2,607 barrels of oil)

[1]Energy use includes space conditioning, service water heating and lighting in accordance with allowable limits under Title 24. This does not include the pumping and filtering of water. Pump energy is considered "source energy" and is not included in the "human comfort" calculations of Title 24.

[2]Water in the tanks will not be heated or cooled; it will remain at the ambient San Francisco Bay temperature. Energy for the tanks will be used for pumping and filtering of Bay water.

[3]Calculations done by Bruce Wallace Partners Ltd., Auckland N.Z. These calculations are available for review at the Office of Environmental Review, 450 McAllister Street, Sixth Floor, San Francisco, California.

[4]Btu (British thermal unit): A standard unit for measuring heat. Technically, it is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit (251.97 calories) at sea level.

[5]Energy Conversion Factors:

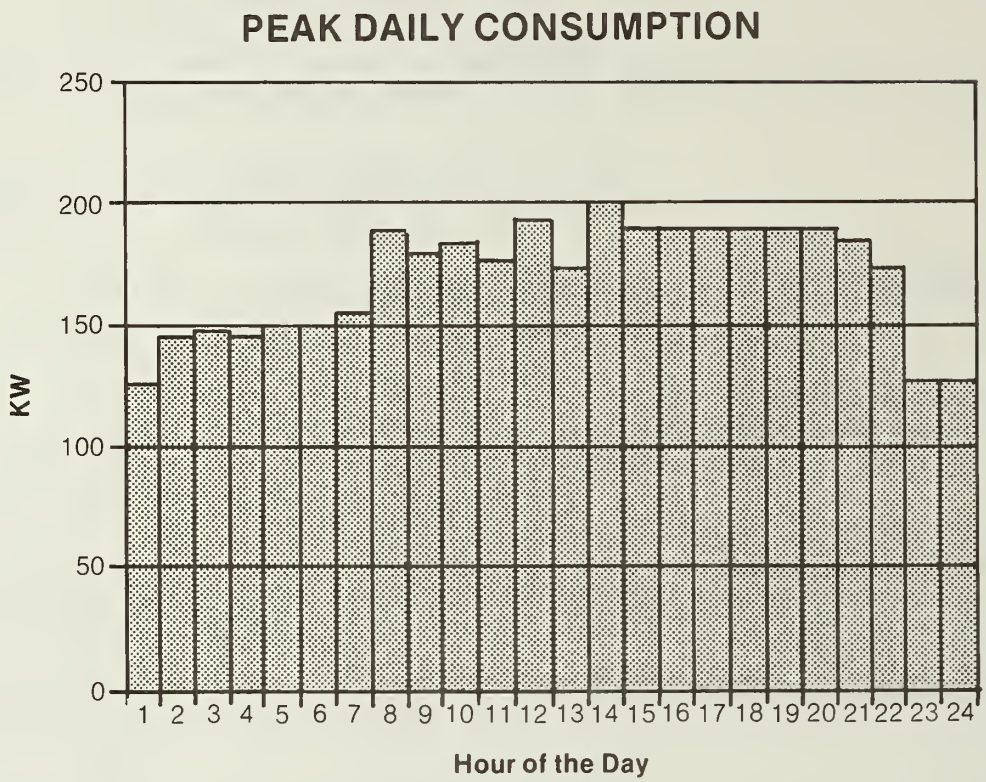
one gallon gasoline	=	125,000 Btu
one kilowatt (kW)	=	10,239 Btu
one therm	=	100,000 Btu
one barrel oil	=	5,600,000 Btu

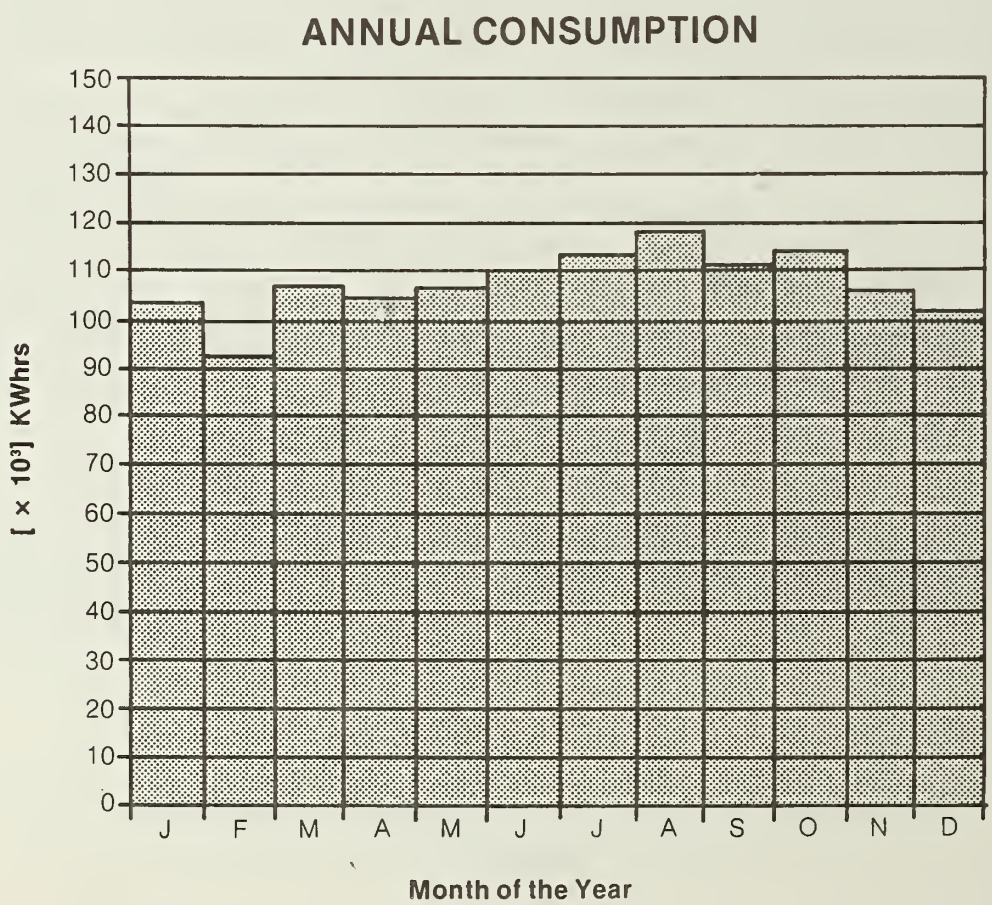
Source: EIP Associates; Bruce Wallace Partners Ltd., Auckland.

ELECTRICITY DISTRIBUTION CURVES
PIER 39 UNDERWATER WORLD

FIGURE 6

SOURCE BRUCE WALLACE PARTNERS LIMITED



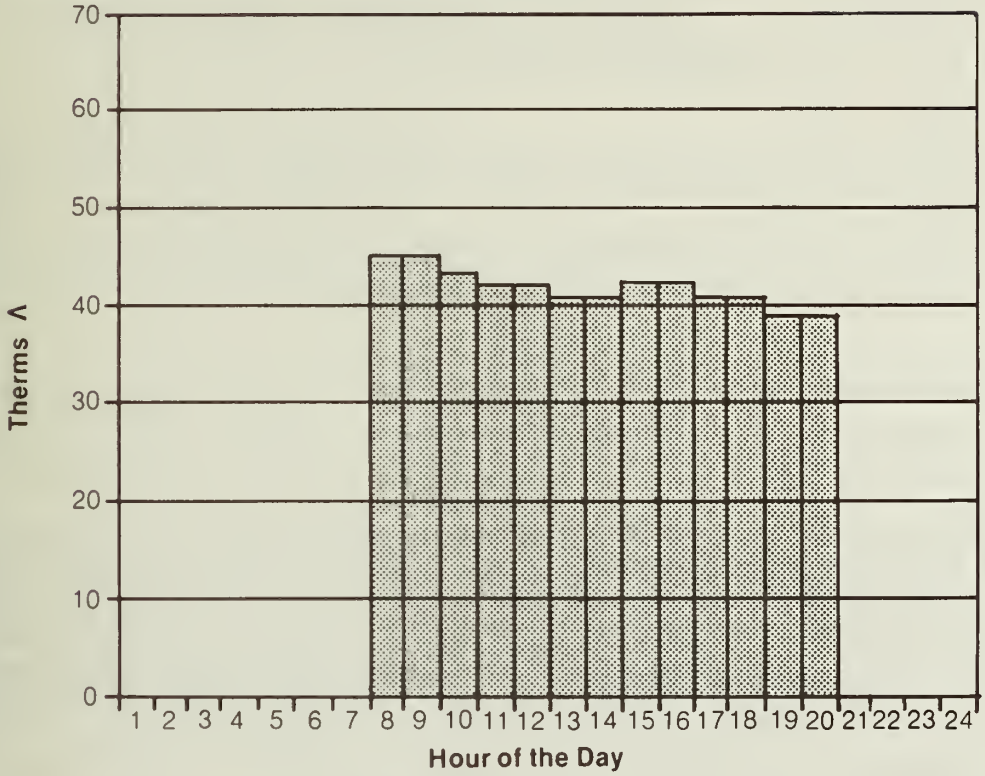


GAS DISTRIBUTION CURVES
PIER 39 UNDERWATER WORLD

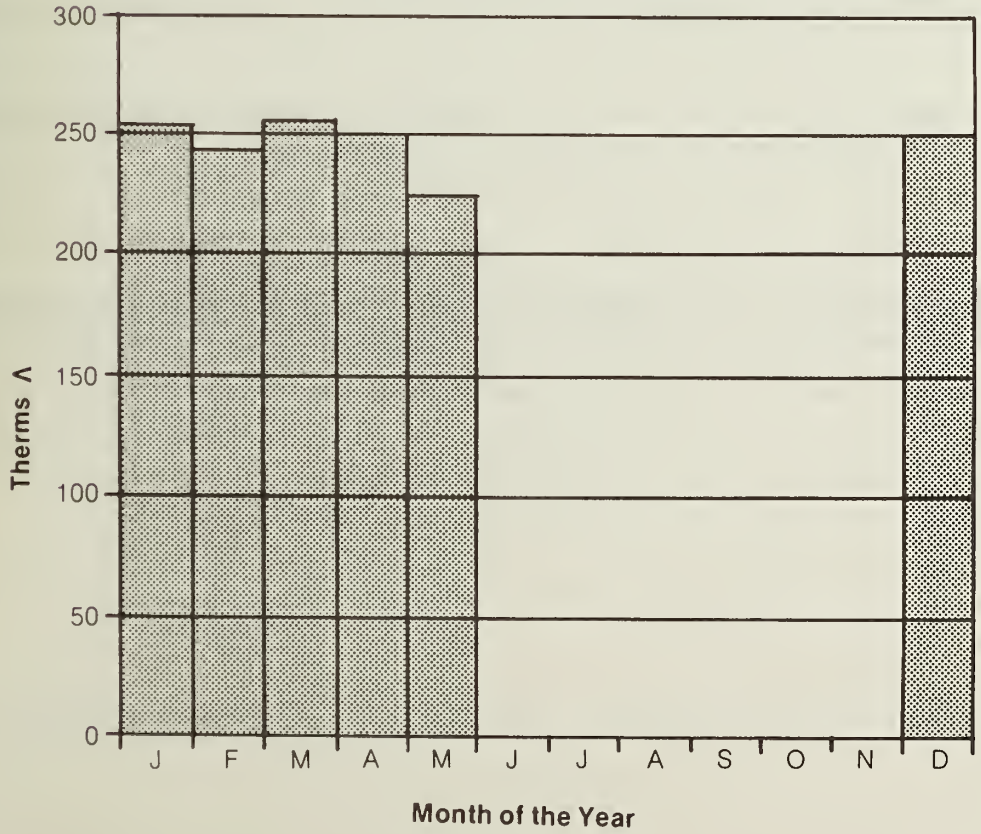
FIGURE 7

SOURCE BRUCE WALLACE PARTNERS LIMITED

PEAK DAILY CONSUMPTION



ANNUAL CONSUMPTION



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San Francisco's electricity requirements would be about 5.0 billion kWh per year by 2000, about a 32% increase from 1984. Peak demand for the city would be about 1,000 MW, a 30% increase in 16 years. About 35 billion cu. ft. of natural gas would be consumed in the City annually by 2000, the same amount as in 1984.[5]

Increased San Francisco energy demands to the year 2000 would be met by PG&E from nuclear sources, oil and gas facilities, hydroelectric and geothermal facilities, and other sources such as cogeneration, wind and imports. PG&E plans to continue receiving most of its natural gas from Canada and Texas under long-term contracts.

These issues will not be discussed further in the EIR.

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[1]The British thermal unit (Btu) is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at sea level. The term "at-source" means that adjustments have been made in the calculation of the thermal energy equivalent (Btu) for losses in energy that occur during generation, transmisstion, and distribution of the various energy forms as specified in: ERCDC, 1977 Energy Conservation Design Manual for New Non-Residential Buildings, Energy Conservation and Development Commission, Sacramento, California, and Apostolos, J.A., W.R. Shoemaker, and E.C. Shirley, 1978 Energy and Transportation System, California Department of Transportation, Sacramento, California, Project #20-7, Task 8.

[2]Hannon, B., et.al., 1978, "Energy and Labor in the Construction Sector," Science 202:837-847.

[3]San Francisco Department of City Planning, Downtown Plan Environmental Impact Report, EE81.3, certified October 18, 1984, Vol. 1, pp. IV.G.3-4.

[4]Ibid.

[5]San Francisco Department of City Planning, Downtown Plan Environmental Impact Report EE81.3, Certified October 18, 1984, Vol. 1, p. IV.G.12.

12. Hazards. Could the project:	Yes	No	Discussed
*a. Create a potential public health hazard or involve the use, production or disposal of materials which pose a hazard to people or animal or plant populations in the area affected?	___	X	X
*b. Interfere with emergency response plans or emergency evacuation plans?	___	X	X
c. Create a potentially substantial fire hazard?	___	X	X

The project would not create a potential public health hazard through the production or disposal of harmful materials. Filtering materials would not be hazardous. Dylox, an organic phosphate, would be used a maximum of 3-4 times a year to treat parasites. This drug has a very short half-life, becoming inert ingredients in 4-5 days. Bacteria in the aquarium water would be treated with ozone (O_3), which quickly dissipates into oxygen. The ozone generating system for the proposed project would be a closed system in which incoming seawater would be pumped into an ozone contact chamber. The ozone would interact with the seawater, destroying bacteria and then rapidly reverting back to oxygen. This oxygen with any remaining traces of ozone would then be recycled back to the ozonator to be used again. The treated effluent, free of bacteria and ozone, would then be pumped into the aquarium tank. Ozone would be generated on site at the rate of 6 lbs of O_3/day using two separate 3 lb units. A small, electric driven air compressor would operate intermittently throughout the day..

An evacuation and emergency response plan would be developed as part of the proposed project (see D. Mitigation Measures, page 25 [page A-29]). The project's emergency response plan would be coordinated with the City's emergency planning activities. The project would not create a substantial fire hazard because it would incorporate more extensive fire protection measures than most buildings in the area to comply with more stringent code standards now in effect. These issues will not be discussed in the EIR.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

	Yes	No	Discussed
13. Cultural. Could the project:			
*a. Disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community, ethnic or social group; or a paleontological site except as a part of a scientific study?	___	X	X
b. Conflict with established recreational, educational, religious or scientific uses of the area?	___	X	___
c. Conflict with the preservation of buildings subject to the provisions of Article 10 or Article 11 of the City Planning Code?	___	X	X

Pile driving for the project would occur in an unfilled portion of the Bay and would not disturb archaeological resources. The proposed project would not result in the demolition of any building rated for architectural or historical significance.

In an archaeological study conducted by Dr. Allen Pastron of Archeo-Tec, it was concluded that "planned construction related activities conducted in conjunction with the present project are not likely to result in adverse impacts to prehistoric archaeological resources." Given this, no additional archaeological procedures are recommended at this time. A copy of the study is on file and available for public review at the Department of City Planning, Office of Environmental Review, 450 McAllister Street, Sixth Floor.

These issues will not be discussed further in the EIR.

	Yes	No	Discussed
C. OTHER. Could the project:			
Require approval of permits from City Departments other than Department of City Planning or Bureau of Building Inspection or from Regional, State or Federal Agencies?	X	___	X

The proposed project would require permits from the Bay Conservation and Development Commission, the Army Corps of Engineers and the Port of San Francisco. A permit from the Regional Water Quality Control Board may be required.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

D. MITIGATION MEASURES	Yes	No	N/A	Discussed
1. If any significant effects have been identified, are there ways to mitigate them?	X			X
2. Are all mitigation measures identified above included in the project?	X			X

MITIGATION MEASURES INCLUDED AS PART OF THE PROJECT

- An evacuation and emergency response plan would be developed by the project sponsor or building management staff, in consultation with the Mayor's Office of Emergency Services, to ensure coordination between the City's emergency planning activities and the project's plan, and to provide for building occupants in the event of an emergency. The project's plan would be reviewed by the Office of Emergency Services and implemented by building management insofar as feasible before issuance of final building permits by the Department of Public Works.

- In order to reduce obtrusive light or glare, the project sponsor would use no mirrored glass on the building.

- The project sponsors would require the general contractors to maintain and operate construction equipment so as to minimize exhaust emissions of TSP and other pollutants, by such means as a prohibition of idling motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs (to reduce emissions) for equipment that would be in frequent use for much of the construction periods.

E. ALTERNATIVES

Alternatives to the proposed project to be analyzed in the EIR include the following:

A. No Project: The site would remain in its existing condition with all existing buildings remaining, or the project would be moved to another unspecified site, not necessarily within the City of San Francisco.

B. Different Waterfront Location: A project located in a freestanding building between Pier 39 and Pier 35.

C. No new fill on existing Pier 39.

D. New access to the existing Pier 39 garage at Stockton Street.

F. MANDATORY FINDINGS OF SIGNIFICANCE	Yes	No	Discussed
*1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or pre-history?	___	X	___
*2. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	___	X	___
*3. Does the project have possible environmental effects which are individually limited, but cumulatively considerable? (Analyze in the light of past projects, other current projects, and probable future projects.)	X	___	___
*4. Would the project cause substantial adverse effects on human beings, either directly or indirectly?	___	X	___

G. ON THE BASIS OF THIS INITIAL STUDY:

___ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the Department of City Planning.

___ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because the mitigation measures, numbers __, in the discussion have been included as part of the proposed project. A NEGATIVE DECLARATION will be prepared.

X I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

BARBARA W. SAHM
Environmental Review Officer

for

Dean L. Macris
Director of Planning

Date: _____

APPENDIX B

TRANSPORTATION

TABLE B-1

PASSENGER LEVELS OF SERVICE ON BUS TRANSIT

	Passengers per Seat
Level of Service A	0.00-0.50
Level of Service A describes a condition of excellent passenger comfort. Passenger loadings are low with less than half the seats filled. There is little or no restriction on passenger maneuverability. Passenger loading times do not affect scheduled operation.	
Level of Service B	
Level of Service B is in the range of passenger comfort with moderate passenger loadings. Passengers still have reasonable freedom of movement on the transit vehicle. Passenger loading times do not affect scheduled operations.	0.51-0.75
Level of Service C	
Level of Service C is still in the zone of passenger comfort, but loadings approach seated capacity and passenger maneuverability on the transit vehicle is beginning to be restricted. Relatively satisfactory operating schedules are still obtained as passenger loading times are not excessive.	0.76-1.00
Level of Service D	
Level of Service D approaches uncomfortable passenger conditions with tolerable numbers of standees. Passengers have restricted freedom to move about on the transit vehicle. Conditions can be tolerated for short periods of time. Passenger loadings begin to affect schedule adherence as the restricted freedom of movement for passengers requires longer loading times.	1.01-1.25
Level of Service E	
Level of Service E passenger loadings approach manufacturers' recommended maximums and passenger comfort is at low levels. Freedom to move about is substantially diminished. Passenger loading times increase as mobility of passengers on the transit vehicle decreases. Scheduled operation is difficult to maintain at this level. Bunching of buses tends to occur which can rapidly cause operations to deteriorate.	1.26-1.50

Table B-1 (continued)

Level of Service F

Level of Service F describes crush loadings. Passenger comfort and maneuverability is extremely poor. Crush loadings lead to deterioration of scheduled operations through substantially increased loading times.	1.51-1.60

Source: Interim Materials on Highway Capacity, Transportation Research Circular 212, pages 73-113, Transportation Research Board, 1980.

L of S - bus passngrs

K INGLESIDE - VAN NESS STATION

Wednesday, September 9, 1981 - 8:00 A.M. - Inbound

N JUDAH - VAN NESS STATION

Wednesday, September 16, 1981 - 5:00 P.M. Outbound

38 GEARY - VAN NESS AVE. AND O'FARRELL ST.

Wednesday, October 21, 1981 - 9:00 A.M. - Inbound

38 GEARY - VAN NESS AVE. AND GEARY BLVD.

Wednesday, October 21, 1981 - 4:20 P.M. - Outbound

Figure B-1 (A)

PHOTOS OF PEAK MUNI LOADING CONDITIONS

SOURCE

ENVIRONMENTAL SCIENCE ASSOCIATES, INC.

30X MARINA EXPRESS - BAYSHORE AVE. AND ARIETA AVE.
Wednesday, October 7, 1981 - 8:00 A.M. - Inbound

J CHURCH - CHURCH ST. AND DUBOCE AVE.
Tuesday, September 29, 1981 - 9:00 A.M. - Outbound

Figure B-1 (B)
PHOTOS OF PEAK MUNI LOADING CONDITIONS

SOURCE
ENVIRONMENTAL SCIENCE ASSOCIATES, INC.

M OCEAN VIEW - CIVIC CENTER STATION

Wednesday, September 9, 1981 - 8:20 A.M. - Inbound

L TARAVAL - VAN NESS STATION

Wednesday, September 16, 1981 - 4:50 P.M. - Outbound

14 MISSION - MISSION STREET AND SOUTH VAN NESS AVE.

Tuesday, September 29, 1981 - 5:45 P.M. - Outbound

N JUDAH - DUBOCE AND CHURCH

Wednesday, June 8, 1983 - 8:00 A.M. Inbound

Figure B-1 (C)

PHOTOS OF PEAK MUNI LOADING CONDITIONS

SOURCE

ENVIRONMENTAL SCIENCE ASSOCIATES, INC.

INTERSECTION ANALYSIS

The capacity analysis of each intersection at which a turning movement count was made utilized the "critical lane" method. This method of capacity calculation is a summation of maximum conflicting approach lane volumes that gives the capacity of an intersection in vehicles per hour per lane. (This method is explained in detail in an article entitled "Intersection Capacity Measurement Through Critical Movement Summations: A Planning Tool," by Henry B. McInerney and Stephen G. Peterson, January 1971, Traffic Engineering. This method is also explained in "Interim Materials on Highway Capacity," Transportation Research Circular No. 212, Transportation Research Board, January 1980). The maximum service volume for Level of Service E was assumed as intersection capacity. A service volume is the maximum number of vehicles that can pass an intersection during a specified time period in which operating conditions are maintained corresponding to the selected and specified Level of Service. For each intersection analyzed, the existing peak-hour volume was computed and a volume-to-capacity (v/c) ratio was calculated by dividing the existing volume by the capacity at Level of Service E.

TABLE B-2

LEVELS OF SERVICE DEFINITIONS
FOR SIGNALIZED INTERSECTIONS[1]

	Volume/Capacity (v/c) Ratio
Level of Service A	< 0.60
Level of Service A describes a condition where the approach to an intersection appears quite open and turning movements are made easily. Little or no delay is experienced. No vehicles wait longer than one red traffic signal indication. The traffic operation can generally be described as excellent.	
Level of Service B	0.61-0.70
Level of Service B describes a condition where the approach to an intersection is occasionally fully utilized and some delays may be encountered. Many drivers begin to feel somewhat restricted within groups of vehicles. The traffic operation can generally be described as very good.	
Level of Service C	0.71-0.80
Level of Service C describes a condition where the approach to an intersection is often fully utilized and back-ups may occur behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. The driver occasionally must have to wait more than one red traffic signal indication. The traffic operation can generally be described as good.	
Level of Service D	0.81-0.90
Level of Service D describes a condition of increasing restriction causing substantial delays and queues of vehicles on approaches to the intersection during short times within the peak period. However, there are enough signal cycles with lower demand such that queues are periodically cleared, thus preventing excessive back-ups. The traffic operation can generally be described as fair.	
Level of Service E	0.91-1.00
Capacity occurs at Level of Service E. It represents the most vehicles that any particular intersection can accommodate. At capacity there may be long queues of vehicles waiting upstream of the intersection and vehicles may be delayed up to several signal cycles. The traffic operation can generally be described as poor.	

Table B-2 (continued)

Level of Service F	1.01+
Level of Service F represents a jammed condition. Back-ups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration. Hence, volumes of vehicles passing through the intersection vary from signal cycle to signal cycle. Because of the jammed condition, this volume would be less than capacity.	

[1] City and County of San Francisco, Department of Public Works, Traffic Engineering Division.

TABLE B-3

TRAFFIC LEVELS OF SERVICE FOR FREEWAYS

	Volume/Capacity (v/c) Ratio*
Level of Service A	
Level of Service A describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.	0.00-0.60
Level of Service B	
Level of Service B is in the higher speed range of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted.	0.61-0.70
Level of Service C	
Level of Service C is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes or pass. A relatively satisfactory operating speed is still obtained.	0.71-0.80
Level of Service D	
Level of Service D approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low, but conditions can be tolerated for short periods of time.	0.81-0.90
Level of Service E	
Level of Service E cannot be described by speed alone, but represents operations at even lower operating speeds (typically about 30 to 35 mph) than in Level D, with volumes at or near the capacity of the highway. Flow is unstable, and there may be stoppages of momentary duration.	0.91-1.00

Table B-3 (continued)

Level of Service F

Level of Service F describes forced flow operation at low speeds (less than 30 mph), in which the freeway acts as storage for queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of downstream congestion. In the extreme, both speed and volume can drop to zero.	1.00+

*Capacity is defined as level of Service E.

Source: Highway Capacity Manual, Special Report 87, Highway Research Board, 1965.

PEDESTRIAN ANALYSIS

The pedestrian analysis has been conducted following methods developed by Pushkarev and Zupard in Urban Space for Pedestrians (MIT Press, 1975). Table B-4 shows the relationship between pedestrian flow rates and the flow regimes (categories) used to describe levels of operation.

TABLE B-4

PEDESTRIAN FLOW REGIMES

Flow Regime	Walking Speed Choice	Conflicts	Flow Rate (P/F/M)[1]
Open	Free Selection	None	0.5
Unimpeded	Some Selection	Minor	0.5 - 2.0
Impeded	Some Selection	High Indirect Interaction	2.0 - 6.0
Constrained	Some Restriction	Multiple	6.0 - 10.0
Crowded	Restricted	High Probability	10.0 - 14.0
Congested	All Reduced	Frequent	14.0 - 16.0
Jammed	Shuffle Only	Unavoidable	16.0+

[1] P/F/M - Pedestrians per foot of sidewalk width per minute.

Source: Boris Pushkarev and Jeffrey M. Zupan, Urban Space for Pedestrians, Massachusetts, MIT Press, 1975.

The borderline between IMPEDED and UNIMPEDED FLOW, with about 130 sq ft (12 m^2) per person, or a flow rate of about 2 people per min per ft (6.5 per m) of walkway width. Individuals as well as couples visible in this view have a choice of speed and direction of movement. This rate of flow is recommended for design of outdoor walkways in office districts and other less dense parts of downtown areas.

The uneven nature of UNIMPEDED FLOW. While the people walking in the plaza which is 17 ft (5.2 m) wide, compared to 23 ft (7 m) in the preceding picture have almost 130 sq ft (12 m^2) per person on the average, the space allocation for the eight individuals in the foreground is closer to 70 sq ft (6.4 m^2). Thus, indirect interaction with others is still quite frequent in the upper range of UNIMPEDED FLOW.

The midpoint of the IMPEDED FLOW range, with about 75 sq ft (6.9 m^2) per person, or a flow rate of about 4 people per min per ft (13 per m) of walkway width. Physical conflicts are absent, but pedestrian navigation does require constant indirect interaction with others. This rate of flow is recommended as an upper limit for the design of outdoor walkways in shopping districts and other dense parts of downtown areas.

Lower range of UNIMPEDED movement, approaching OPEN FLOW. About 350 sq ft (32.2 m^2) per person, or a flow rate of less than 1 person per min per ft (3.3 per m) of walkway width. Complete freedom to select the speed and direction of movement; individuals behave quite independently of each other. For a design standard based solely on pedestrian density, this amount of space can be considered excessive.

Figure B-2 (A)
PHOTOS OF PEDESTRIAN FLOW LEVELS

SOURCE: Pushkarev and Zupan

JAMMED FLOW. Space per pedestrian in this view is about 3.8 sq ft (0.35 m^2). This is representative of the lower half of the speed-flow curve, where only shuffling movement is possible and even the extremely uncomfortable maximum flow rate of 25 people per min per ft (82 per m) of walkway width cannot be attained due to lack of space. Photograph by Louis B. Schlivek.

The threshold of CONGESTED FLOW. The first eleven people in the view have about 16 sq ft (1.5 m^2) per person, corresponding to a flow rate of about 15 people per min per ft (49 per m) of walkway width. The beginnings of congestion are evident in bodily conflicts affecting at least three of the walkers, and in blocked opportunities for walking at a normal pace.

The onset of CROWDED FLOW, with an average of about 24 sq ft (2.2 m^2) per person, or a flow rate of about 10 people per min per ft (33 per m) of walkway width. Choice of speed is partially restricted, the probability of conflicts is fairly high, passing is difficult. Voluntary groups of two, of which two can be seen in the picture, are maintained, but cause interference. Note also some overflow into the vehicular roadway in the background.

The midpoint of the CONSTRAINED FLOW range, with about 30 sq ft (2.8 m^2) per person, or a flow rate of about 8 people per min per ft (26 per m) of walkway width. The choice of speed is occasionally restricted, crossing and passing movements are possible, but with interference and with the likelihood of conflicts. The man in the dark suit seems to be able to cross in front of the two women in the foreground quite freely, but in the background near the curb people are having difficulty with passing maneuvers.

Figure B-2 (B)

PHOTOS OF PEDESTRIAN FLOW LEVELS

SOURCE: Pushkarev and Zupan

APPENDIX C

AIR QUALITY

APPENDIX C

AIR QUALITY

SAN FRANCISCO AIR POLLUTANT SUMMARY 1984-1986[1]

Location: 900 23rd Street, San Francisco

Pollutant	Federal Standard[2]	State Standard[3]	1984	1985	1986
Carbon Monoxide (CO)					
1-hour average (ppm)	35	20			
Highest hourly average			11.0	10.0	9.0
No. of exceedances			0	0	0
8-hour average (ppm)	9	9			
Highest 8-hour average			10.8[4]	15.0[4]	12.6[4]
No. of exceedances			0	0	2
Ozone (O_3)					
1-hour average (ppm)	.12[5]	.10			
Highest hourly average			0.10	0.09	0.07
No. of exceedances			0	0	0
Nitrogen Dioxide (NO_2)					
1-hour average (ppm)	None	.25			
Highest hourly average			0.14	0.12	0.11
No. of exceedances			1	0	0
Sulphur Dioxide (SO_2)					
24-hour average (ppm)	.14	.05			
Highest 24-hour average			0.033	0.032	0.010
No. of exceedances			0	0	0
Total Suspended Particulate (TSP)					
24-hour average (ug/m^3)	260	100			
Highest 24-hour average			152	158	124
No. of exceedances			5	5	5
Annual Geometric Mean (ug/m^3)[6]	75	60			
Annual Geometric Mean			60.0	62.0	52.0
Annual Exceedances			Yes	Yes	No

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Appendix C Table (Continued)

Pollutant	Federal Standard[2]	State Standard[3]	1984	1985	1986
Lead					
3-month Average (mg/m^3)	1.5	None			
Highest 3-month average			0.7	0.3	0.2
No. of exceedances			0	0	0
1-month Average (mg/m^3)	None	1.5	0	0	0
No. of exceedances	---	---	0	0	0

[1] 1984-1986 data collected at 900 23rd Street.

[2] Federal standard are not to be exceeded more than once per year. Annual average standards are not to be exceeded.

[3] State standards are not to be equaled or exceeded, except for CO standards, which are not to be exceeded.

[4] Micro scale site (Ellis St. for street level maximums).

[5] The federal standard is given in terms of Expected Annual Excesses which is based on a 3-year running average.

[6] The annual Geometric Mean is a single number which applies to an entire year of data. "No" indicates TSP concentrations did not exceed 60 (ug/m^3).

Note: ppm = parts per million
ug/mg^3 = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter

Source: BAAMQD, Air Pollution in the Bay Area by Station and Contaminant, March issues, 1984-1986; and California Air Resources Board, California Air Quality Data, Annual Summaries, 1984-1986.

APPENDIX D

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL NOISE

APPENDIX D

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL NOISE

This section provides background information to aid in understanding the technical aspects of this report.

Three dimensions of environmental noise are important in determining subjective response. These are:

a. the intensity or level of the sound

b. the frequency spectrum of the sound

c. the time-varying character of the sound

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or Hertz (Hz). Most of the sounds which we hear in the environment do not consist of a single frequency, but of a broad band of frequencies, differing in level. The quantitative expression of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into ten segments.

Many rating methods have been devised to permit comparisons of sounds having quite different spectra. Fortunately, the simplest method correlates with human response practically as well as the more complex methods. This method consists of evaluating all of the frequencies of a sound in accordance with a weighting that progressively and severely deemphasizes the importance of frequency components below 1000 Hz, with mild deemphasis above 5000 Hz. This type of frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency midrange.

The weighting curve described above is called "A" weighting, and the level so measured is called the "A-weighted sound level," or simply "A-level."

The A-level in decibels is expressed "dBA"; the appended letter "A" is a reminder of the particular kind of weighting used for the measurement. In practice, the A-level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. All U.S. and international standard sound level meters include such a filter. Typical A-levels measured in the environment and in industry are shown in Figure 1.

Although the A-level may adequately describe environmental noise at any instant in time, the fact is that the community noise level varies continuously. Most environmental noise includes a conglomeration of distant noise souces which create a relatively steady background noise in which no particular source is identifiable. These distant sources may

include traffic, wind in trees, industrial activities, etc. These noise sources are relatively constant from moment to moment, but vary slowly from hour to hour as natural forces change or as human activity follows its daily cycle. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities or single vehicle passages, aircraft flyovers, etc., which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. The L10 is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L10 is considered a good measure of the "average peak" noise. The L50 is the A-weighted sound level that is equaled or exceeded 50 percent of a stated time period. The L50 represents the median sound level. The L90 is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period. The L90 is used to describe the background noise.

As it is often cumbersome to describe the noise environment with these statistical descriptors, a single number descriptor called the Leq is also widely used. The Leq is defined as the equivalent steady-state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same time period. The Leq is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noises become very noticeable. Further, most people are sleeping at night and are very sensitve to noise intrusion.

To account for human sensitivity to nighttime noise levels a descriptor, Ldn, (day-night equivalent sound level) was developed. The Ldn divides the 24-hour day into the daytime of 7 a.m. to 10 p.m. and the nighttime of 10 p.m. to 7 a.m. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Ldn, then, is the A-weighted average sound level in decibels during a 24-hour period with 10 dBA added to the hourly Leqs during the nighttime. For highway noise environments the Leq during the peak traffic hour is approximately equal to the Ldn.

The effects of noise on people can be listed in three general categories:

1. subjective effects of annoyance, nuisance, dissatisfaction
2. interference with activities such as speech, sleep, learning
3. physiological effects such as startle, hearing loss

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Unfortunately, there is as yet no completely satisfactory measure of the subject effects of noise, or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance, and habituation to noise over differing individual past experiences with noise.

Thus, an important parameter in determining a person's subjective reaction to a new noise is the existing noise environment to which one has adapted: the so-called "ambient" noise. "Ambient" is defined as "the all-encompassing noise associated with a given environment, being a composite of sounds from many sources, near and far." In general, the more a new noise exceeds the previously existing ambient, the less acceptable the new noise will be judged by the hearers.

With regard to increases in noise level, knowledge of the following relationships will be helpful in understanding the quantitative sections of this report:

1. Except in carefully controlled laboratory experiments, a change of only 1 dBA cannot be perceived.

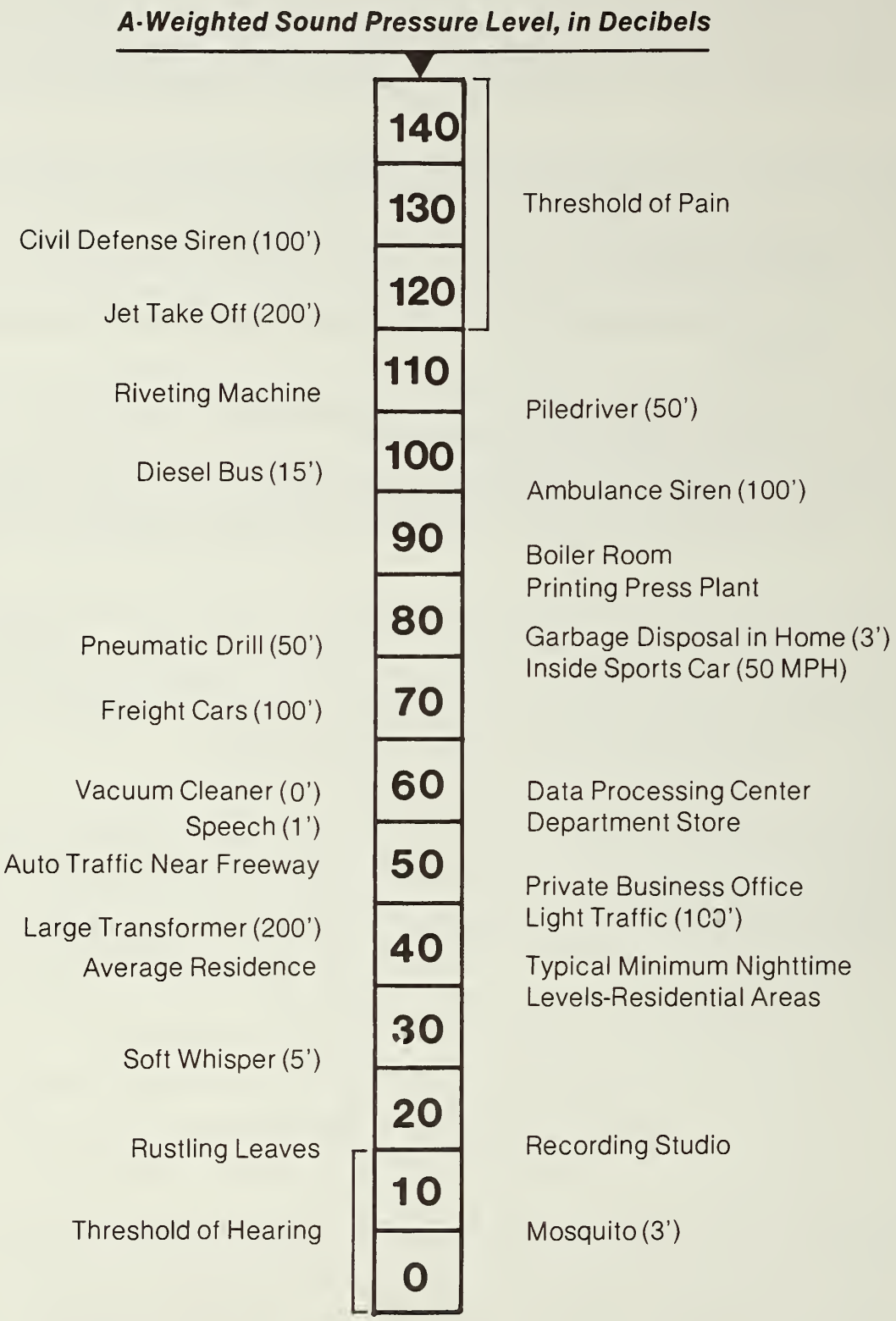
2. Outside of the laboratory, a 3-dBA change is considered a just-noticeable difference.

3. A change in level of at least 5 dBA is required before any noticeable change in community response would be expected.

4. A 10-dBA change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse change in community response.

Source: Charles M. Salter Associates, Inc., December 1982.

TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY



SOURCE: CHARLES M SALTER ASSOCIATES, INC. 1982

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APPENDIX E

CITY PLANNING COMMISSION RESOLUTIONS 7551 AND 8548

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SAN FRANCISCO

CITY PLANNING COMMISSION

RESOLUTION NO. 7551

WHEREAS, Application No. CU76.8 has been made by Waterfront Recreational Facilities, Inc. (Developer) to the San Francisco City Planning Commission for conditional use authorization to develop a commercial and marina project, as set forth in "Exhibit A - Preliminary Plans for North Point Park/Marina", on property under the jurisdiction of the Port of San Francisco in the general location of Piers 37 - 41; and

WHEREAS, The City Planning Commission has certified an Environmental Impact Report for said North Point Park/Marina; and

WHEREAS, The City Planning Commission has amended the Northern Waterfront Plan of the Master Plan in order to change previous objectives, policies and maps relating to the area of Piers 37 - 41; and

WHEREAS, The Developer will cooperate with the Department of City Planning in securing general endorsement, by the responsible public and private bodies, of plans for public improvements in the Fisherman's Wharf area to mitigate the vehicular and pedestrian traffic impacts of the project, as described in "Exhibit B;" and

WHEREAS, The San Francisco Art Commission and the State of California Bay Conservation and Development Commission also have jurisdiction over North Point Park/Marina development; and

WHEREAS, The Northern Waterfront Planning Advisory Committee has recommended to the City Planning Commission that relatively intensive commercial development be allowed in the area of Piers 37 - 41 in exchange for the limiting of commercial use of the Ferry Building area waterfront to only those interim uses which are designed to minimize impact on future maritime uses; and also recommended the development of the North Point Park/Marina, subject to conditions to be applied by the City Planning Commission;

THEREFORE BE IT RESOLVED, That the City Planning Commission finds that the criteria set forth in Section 303(c) of the City Planning Code are met and said Conditional Use is hereby AUTHORIZED in accordance with standards specified in the City Planning Code and subject to further conditions as follows:

1. Development of final plans shall be in general conformity with plans on file with this authorization labeled "Exhibit A", and including "Overall Plan" dated August 18, 1976 and "Landscape Plan" dated August 26, 1976; and in general conformity with conditions stated in the document on file with this authorization labeled "Exhibit B - Design Standards for North Point Park/Marina" and the map labeled "Exhibit C - Site Diagram of North Point Park/Marina". Final plans for the development of all elements of the project, including the park, garage, commercial development, signs and any temporary or permanent structures located on the site, shall be developed in consultation with the Department of City Planning and the Art Commission and shall be approved prior to approval of any building permits.

2. The developer shall provide a park of a minimum of 5.2 acres including the fishing area on the breakwater at Pier 41 parallel to Pier 39, of the general level of quality of Sidney Walton Park in San Francisco, and having the following features:

   a. The park and water's edge shall be designed to be freely accessible.

   b. There shall be no permanent buildings or structures in the park, except those required for emergency services, maintenance, public transit, or other

services that complement the recreational function of the park, such as small convenience food vending.

c. The park shall provide adequate views of the Bay from inland properties and from the park, taking into account requirements of proper park design.

d. The development and maintenance of landscaping shall conform to the Department of City Planning "Standard Regulations for Landscaping Improvements", May 1974; and all landscaping shall be continuously maintained and replaced as necessary to sustain plants in a healthy, attractive condition and to promote normal growth and full development typical of their species.

e. The Developer shall make provision to mitigate adverse wind effects.

f. A bicycle path shall be provided through the park generally parallel to the Embarcadero roadway.

g. Protected bicycle parking shall be provided within the proposed garage and may be provided within the project area at appropriate locations.

h. The park shall be coordinated with the .5 acre park area under lease from the Port to Golden Gate Scenic Steamship Lines and Harbor Tug and Barge, Inc.

3. The parking garage shall have a maximum capacity sufficient to cover the following: 850 spaces for North Point Park/Marina, and 150 spaces for Harbor Tours as required by the Development Agreement between the Developer and the Port of San Francisco. The garage shall be designed in consultation with the Department of City Planning and the Traffic Engineering Division of the Department of Public Works in conformance with standards described in "Exhibit B"; and shall have vehicular access and egress only at those locations shown in "Exhibit C".

4. Construction of the garage shall not commence unitl the developer has started construction on 15 percent of the total commercial space and 15 percent of the total marina; and has binding commitments to lease at least 50 percent of the commercial space.

5. Prior to commencement of construction of the garage, approvals and funding shall have been obtained for the relocation of that section of The Embarcadero roadway between Powell and Kearny Streets. Prior to occupancy of any garage or commercial facilities, said roadway shall been relocated to accommodate park development in general conformance with "Exhibits A, B and C" on file with this authorization, and all breakwaters shall have been completed; unless a later date for relocation of the roadway and construction of the breakwaters shall have been approved by the City Planning Commission.

6. The area of improvements to be made as part of this project shall include the following parcels, as shown in "Exhibits A and C":

   a. the area between the improved Embarcadero roadway and the existing curb line of The Embarcadero between Beach and North Point Streets, and

   b. the entire areas of Seawall Lots 311 and 312.

7. The Developer shall provide design assistance to Golden Gate Scenic Steamship Lines and Harbor Tug and Barge, Inc. so that land leased by those companies between the existing curb line and the waterfront line east of Powell Street adjacent to Pier 41, will be developed in conformity with the overall plan of the park.

8. A proper legally binding bond or other security or guarantee satisfactory to the City Planning Commission, approved by the City Attorney as to form, and the City Controller as to surety, to be in an amount sufficient to cover the cost of constructing the park, shall be posted by the Developer with the Department of City Planning guaranteeing completion of the park. Use of this security or guarantee shall be made to construct the park if construction of the park has not begun within 90 days after 40 percent of the commercial space has been occupied, or within one year after any portion of the project has been occupied; or if said park construction has not thereafter been diligently pursued to completion. Said posting of this security or guarantee shall occur prior to the approval of any building permits for the project.

9. There shall be no facilities in the project which would allow the take-off or landing of aircraft.

I hereby certify that the foregoing Resoltuion was ADOPTED by the City Planning Commission at its regular meeting of August 26, 1976.

Lynn E. Pio
Secretary

AYES: Commissioners Dearman, Finn, Lau, Miller, Rosenblatt.

NOES: Commissioners Bierman, Starbuck.

ABSENT: None

PASSED: August 26, 1976

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CU76.8

EXHIBIT B
DESIGN STANDARDS FOR NORTH POINT PARK/MARINA

SAN FRANCISCO
CITY PLANNING COMMISSION

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A. General

1. North Point Park should meet the active and passive recreation needs of visitors and residents of all ages, and all park areas should be freely accessible to the public.

2. The leases of the Eagle Cafe and the Crow's Nest Restaurant should not be extended at their present locations, and these facilities should be relocated into the commercial development on Pier 39 at the commencement of construction, if possible.

3. Design elements that communicate the themes of maritime activity and the history of San Francisco should be incorporated into the park design.

4. Park design should be coordinated with existing and future pedestrian-ways and open space along the Northern Waterfront east and west of the project site in order to facilitate future expansion of these facilities.

5. The parking rates of the garage should encourage short-term parking, and the garage should be open to the general public.

B. Plant Materials

1. Most of the areas within the park boundaries that overlay earth fill should have non-containerized vegetation and lawn areas. Containerized plant materials should be used in pedestrian areas and those portions of the park situated on existing concrete slab and concrete pier substructure, located between the existing "waterfront line" and the "back of bulkhead line" as shown on the Port of San Francisco General Survey drawing number 6244-406-2, November 1955.

2. Plant materials consisting of trees, shrubs, and ground covers should have a demonstrated capacity to remain viable, assuming required maintenance care, under such conditions as (a) frequent wind speeds up to, and exceeding, 35 m.p.h.; (b) high atmospheric salt content; (c) a high salt-water table ranging from 3 to 5 feet beneath the existing earth-fill areas under and adjacent to The Embarcadero roadway; and (d) sub-surface earth-fill material consisting of a mixture of construction rubble, rocks, sand and gravel with varying drainage capacities.

3. The document by the Department of City Planning "Street-tree Planting Plan for the Northern Waterfront" October, 1973 should be examined as a general guide to appropriate plant materials.

C. Wind Abatement

1. Possible solutions to wind problems include utilizing such devices as wind barriers, plant materials, earth mounding and the combination of plant containers and depressed seating. Reasonable protection for people from excessive wind, and adjacent traffic noise, should be provided.

2. Building layouts, roof designs and building orientation along Pier 39 should provide maximum wind shelter and sunlight to interior courtyards.

3. Trees of between 2 and 4 inches in girth and from 12 to 20 feet in height shall be installed with combinations of appropriate shrubs to achieve immediate reduction of wind velocity in critical pedestrian gathering areas.

D. Views

1. Grade level views looking north to the Bay should be created through the park from Powell, Stockton, Grant and Kearny Streets and looking east to the Bay from Jefferson and Beach Streets, except for a pedestrian overpass or covered at-grade walkway which should be designed to minimize

view blockage. Within these corridors, defined by the projection of these street rights-of-way over the park and breakwaters, structures or vegetation that obstructs views should not occur.

2. The park should provide continuous Bay vistas and should have a variety of viewing experiences.

3. A public open space with panoramic views should be provided at the end of Pier 39.

E. Pedestrian Circulation Areas

1. Park entrances at Jefferson and Kearny Streets should denote the gateway to a major public open space; there should be no sense of constriction or of entering a private area in the design of these spaces.

2. The rail and bus transit stops, auto drop-off zone, people-mover loading areas and pedestrian cross-walks of the Embarcadero should all be integrated at the entrance to Pier 39.

3. A variety of edge conditions should be provided along the water's edge of the park, such as steps, and narrow gangway paths with water on both sides.

4. The fishing pier/breakwater at Pier 41 parallel to Pier 39, and the perimeter of Pier 39, should allow pedestrian access and provide places for public fishing.

5. Interior plazas on Pier 39 should provide appropriate landscaping features, including nautical relics and ample outdoor seating.

F. Landscape Furniture

1. Salvaged pier planking and pilings should be used as building material, where feasible, for such elements as plant containers, steps and walks, light and sign poles, railings, seating and tables, transit stops and telephone booths.

2. There should be no commercial signs in the park other than identification signs on small convenience food facilities; only directional regulatory, or informational signs should occur. They should have consistency in lettering, color and style, and should keep a maritime theme.

3. All lighting should be sufficient for public safety, and avoid unnecessary glare. The design of fixtures should be in keeping with the park character and landscape furniture.

G. Garage Design

In the preparation of final plans for the garage, special attention will be given by the Department of City Planning in its review to the following design considerations:

1. The creation of a building facade that is compatible with the scale and character of the surrounding maritime area.

2. The design of frontages along sidewalks that enhance the pedestrian environment.

3. The selection of appropriate exterior texture and color treatments.

4. The visual screening of interior spaces of the garage at ground level (except at the entrances) in an attractive manner.

5. The design of interior garage lighting which prevents the direct illumination of areas beyond the building.

6. Prior to commencement of garage operation, the approval of all lighting and signs by the Department of City Planning.

7. The mitigation of the visual impact of parked cars by landscaping, roof and facade design. Particular attention should be given to the appearance of the garage from Telegraph Hill.

8. The provision of landscaping around the garage on the north and east sides in general conformity with the overall design of North Point Park.

H. Service Area

1. To the extent possible, all vehicles should be stored in the garage and not in the service area.

2. Service buildings should be arranged to minimize view blockage and permit continuous pedestrian access along the water's edge. Their visual impact should be the minimum possible.

3. There should be no employee parking in the service area.

I. The Embarcadero Roadway

The following describes The Embarcadero roadway as it is to be relocated to accommodate park development, in general conformity with "Exhibits A and C":

1. Between Jefferson and Beach Streets The Embarcadero roadway should be relocated as far inland as possible and should consist of two northbound traffic lanes, one northbound rail/bus transit lane and, if determined to be necessary, one southbound traffic lane.

2. Between Beach and North Point Streets The Embarcadero should be relocated as far inland as possible and should consist of two northbound traffic lanes, one northbound rail/bus transit lane, one southbound traffic lane, and one southbound combined rail/bus/traffic lane.

J. Traffic Improvements

The Developer will cooperate with the City Planning Commission, Department of City Planning, Port of San Francisco and all other necessary agencies and groups in the accomplishment of improvements such as the following, in order to create the best possible pedestrian and vehicular circulation system for the Fisherman's Wharf area:

1. The relocation and narrowing of the Embarcadero in general conformity with "Exhibits A and C".

2. The relocation of surface parking away from Piers 43 and 43½ to provide greater walkways and open space around the piers.

3. The creation of a plaza on Taylor Street, and adjacent area, between Jefferson Street and The Embarcadero, with service access to the [illegible]

4. The conversion of Jefferson Street between Powell and Hyde Streets to one-way westbound, with an exclusive rail/bus transit lane.

5. The conversion of Beach Street between Grant and Polk Streets to one-way eastbound, with an exclusive rail/bus transit lane between Polk and Columbus Streets.

6. The provision of rail/bus transit lanes on The Embarcadero between North Point and Jefferson Streets. If Interstate Highway Funds from the uncompleted I-280 freeway can be used for traffic improvements in the Fisherman's Wharf area, they should be used to develop the rail/bus transit lanes described in (4), (5) and (6) above.

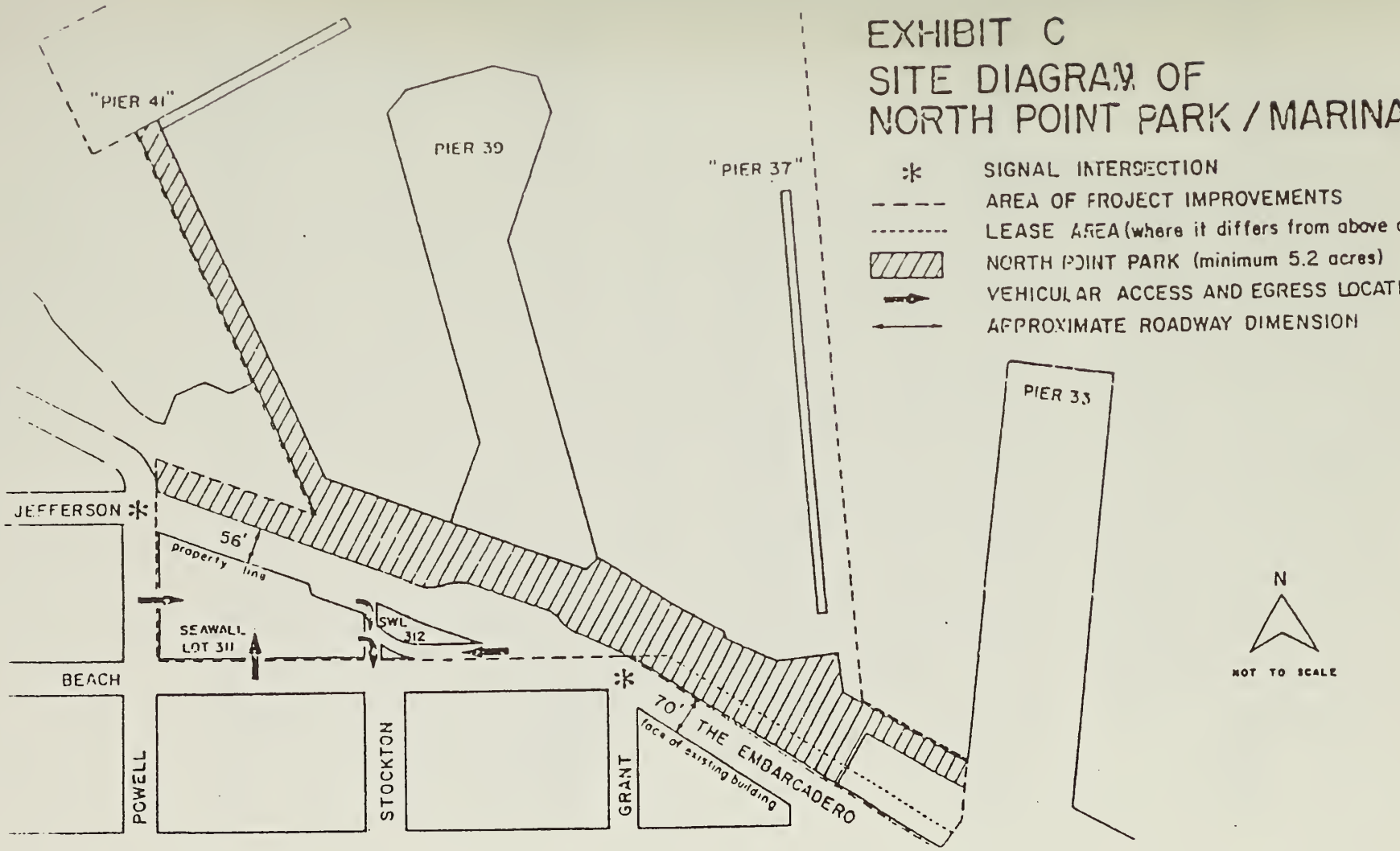
7. The provision of traffic signals at the intersections indicated in "Exhibit C".

8. The relocation of tour buses away from the Bay, possibly to a place along Jefferson Street between Powell and Mason Streets.

9. The removal of metered parking spaces on the north side of The Embarcadero between Mason and Powell Streets (approximately 15 spaces) to allow (2) above to occur; and the removal of metered parking spaces along the north side of Jefferson Street between Mason and Powell Streets (approximately 12 spaces) to allow (8) above to occur.

10. The development of vehicular access to the parking lot of Golden Gate Scenic Steamship Lines and Harbor Tug and Barge from The Embarcadero west of Powell Street rather than through the park.

EXHIBIT C
SITE DIAGRAM OF NORTH POINT PARK / MARINA



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SAN FRANCISCO

CITY PLANNING COMMISSION

RESOLUTION NO. 8548

WHEREAS, The City Planning Commission on March 27, 1980 considered an application for conditional use authorization(CU79.107) to modify a previous authorization for a retail/entertainment/park complex, on property described as follows:

> Property in the jurisdiction of the Port of San Francisco, Piers 37, 39, and part of 41, and Sea Wall Lots 311 and 312, in C-2 and P zoning districts and in Northern Waterfront Special Use District No. 1;

and

WHEREAS, The Commission on August 26, 1976 approved under CU76.8 Resolution No. 7551 which authorized development of the North Point Park/Marina (Pier 39) project as a commercial use on the Northern Waterfront, subject to conditions including the following:

> "There shall be no permanent buildings or structures in the park, except those required for emergency services, maintenance, public transit, or other services that complement the recreational function of the park, such as small convenience food vending;" and
>
> "There shall be no commercial signs in the park other than identification signs on small convenience food facilities; only directional regulatory, or informational signs should occur;" and
>
> "Service buildings should be arranged to minimize view blockage and permit continuous pedestrian access along the water's edge;" and

WHEREAS, The subject application is for authorization to locate facilities for a commercial tour boat operation in the western park area, to locate signs for that operation in the park, to relocate a proposed service building from the eastern end of the park to the eastern end of the parking garage on Sea Wall Lot 311, and to eliminate the pedestrian access adjacent to the service yard which was proposed for the eastern end of the park; and

WHEREAS, Facilities for the tour boat operation have been temporarily located in the park without the required authorization of the Commission; and

WHEREAS, An administrative amendment to the Final Environmental Impact Report for the project (EE75.368) was prepared on March 24, 1980 for the requested authorization:

THEREFORE, BE IT RESOLVED, That before acting on the application, the Commission certifies that they have considered the information in the administrative amendment to the Final Environmental Impact Report; and

BE IT FURTHER RESOLVED, That the Commission finds the criteria of Sections 240.1 and 303 of the City Planning Code are met, and hereby APPROVES a conditional use to modify Resolution No. 7551 to the extent necessary to allow the development proposed under plans filed with the subject application, CU79.107, subject to the following conditions:

1. This authorization is for facilities for operation of tour boats at the western area of the park, relocation of the previously approved service building to the east end of the garage and elimination of the walkway along the water north of the service yard.

2. Final plans for each element of the proposal shall be in general conformity to the plans on file with the application at the Department of City Planning labeled "Exhibit A."

3. The only tour boat facilities authorized to be in the park are a ticket kiosk placed approximately in the center of the large paved area in the western park with appropriate signing on the face of that kiosk and banners on the four flagpoles at the pier entrance.

4. An entrance and/or exit for the parking garage shall be provided in the ground floor of the new service building and shall be made operational at such time as the transit lane on the Embarcadero is needed for public transit and if the Department of City Planning in consultation with the Department of Public Works and Police Department determines that said entrance and/or exit is needed to provide adequate traffic circulation in the general area.

5. Such landscaping as is deemed appropriate by the Department of City Planning, shall be provided to screen and reduce the mass of the service building.

I hereby certify that the foregoing Resolution was ADOPTED by the City Planning Commission at its regular meeting of March 27, 1980.

Lee Woods, Jr.
Secretary

AYES: Commissioners Bierman Dearman, Karasick, Kelleher, Nakashima, Rosenblatt.

NOES: None.

ABSENT: Commissioner Starbuck.

PASSED: March 27, 1980.